ARCHIVES OF OTOLOGY.

OTALGIA CONSIDERED AS AN AFFECTION OF THE SENSORY SYSTEM OF THE SEVENTH CRANIAL NERVE.[1]

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(*With two illustrations on Text-Plate III.*)

INTRODUCTION.

THE object of the present study is to show the relationship of otalgia to the seventh cranial nerve; not of the facial nerve proper, but of its sensory system, which consists of the nerve of Wrisberg, the geniculate ganglion, and the petrosal nerves (great and small superficial petrosal, great and small deep petrosal, and the external petrosal nerves); also that otalgia bears the same relation to the facial nerve as does prosopalgia to the trifacial, and that in the facial nerve is to be found a sensory and reflex factor of great importance in the innervation of the auditory mechanism. Save for an uncertain relation to the taste fibres of the chorda tympani, the sensory mechanism of the facial has played no rôle in symptomatology, and has not had attached to it any definite sensory functions.

In nearly all modern treatises on otology are to be

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found descriptions of the various clinical forms of otalgia, a large group of non-inflammatory earaches. These have been subdivided into primary otalgia, reflex otalgia, and secondary or herpetic otalgia. The pain is neuralgic in character and sharply circumscribed to the structures of the ear; it may be localized in the auricle, the auditory canal, or in the depths of the ear. Following the distribution of the pain, various groups of nerves are supposed to represent the underlying anatomical basis. Thus there are described neuralgia of the tympanic plexus; of the plexus of the Eustachian tube; of the auricular branches of the trigeminus; and of the auricular branches of the cervical nerves. A pain, if situated in the depths of the ear, is referred to the tympanic plexus; when on the anterior surface of the auricle, to the trigeminus; and when on its posterior surface, to the cervical plexus. While it cannot be denied that pain in the auricle may accompany the paroxysms of tic douloureux and occipito-cervical neuralgia, it would seem rather forced to ascribe to either of these large distributions a sharply circumscribed otalgia which shows no tendency to diffusion or extension into other areas.

A careful consideration of the prevailing views will show that the subject of otalgia is by no means clear, and that a well defined anatomical basis does not exist; furthermore, that we are very far from having a satisfactory understanding of many reflex aural neuroses described in otological literature. I believe that the introduction of the facial nerve into the realm of otalgia, and its evident sensory importance in the auditory mechanism, will supply an important key to the solution of these problems.

My attention was first directed to this subject by a study of the herpetic pain in cases of herpes zoster of the ear. This group of cases described under the title of Herpes Zoster Auris, or Herpes Zoster Oticus, is dependent upon a specific inflammation of the geniculate

ganglion of the facial nerve, situated in the depths of the internal auditory canal.[1]

In this localization of zoster the pre- and post-herpetic pains are often very severe and intractable; so severe in some cases, that trained otologists have incised the tympanum suspecting a middle-ear complication. These pains are variously referred to the surface of the auricle, the auditory canal, or the depths of the ear,—the same distribution, approximately, as occurs in idiopathic and reflex otalgia.

Should there exist anywhere in the nervous system a sensory ganglion, the peripheral or surface representation of which was unknown or doubtful, the distribution of the pains following a circumscribed lesion of this ganglion would serve as a most valuable guide. Such a ganglion of unknown representation have we in the geniculate; and such a circumscribed lesion have we in herpes zoster —an affection dependent upon a specific inflammation of sensory ganglia of the spinal type. It is for this reason that I attach paramount importance to the distribution of the pain in herpes oticus, as giving the cue to the pain distribution and representation of this sensory system. I would particularly emphasize the fact that these pains are referred to the auricle, auditory canal, and depth of the ear; in other words, in the same area of localization as is found the otalgia of idiopathic or reflex origin, which heretofore have been relegated to the trigeminus, the cervical, or the tympanic plexuses.

ANATOMICAL CONSIDERATIONS.

I would here give in brief a few facts from anatomy and embryology bearing on the sensory mechanism of the facial nerve, which serve to emphasize its close relation to the auditory mechanism. The facial nerve, in the

[1] "Herpetic Inflammations of the Geniculate Ganglion. A New Syndrome and its Complications." By J. RAMSAY HUNT.—*Jour. of Nerv. and Ment. Dis.* (Feb., 1907), and ARCH. OF OTOLOGY, vol. xxxvi., No. 4, 1907.

primitive forms of life, is the nerve of the first branchial or ear cleft (the spiracle). From the ear cleft are developed the structures of the middle and external ear. Not only is there this relation to the conducting mechanism of the ear, but both the 7th and 8th nerves spring from a common ganglionic outgrowth of the neural ridge (the ganglion acustico-facialis). From the ganglion acusticum, which joins the otic vesicle, are developed the ganglia of Corti, Scarpa, and the auditory nerve. The ganglion faciale is represented at a later period of development by the geniculate ganglion, from which is developed the *pars intermedia* or nerve of Wrisberg; so that in developmental processes there is found a most intimate relationship between the facial nerve and its ganglion, the ganglia of the acoustic nerve, and all those structures which go to form the auditory mechanism.

Anatomically, the facial is a mixed nerve, as are the 5th, 9th, and 10th nerves, having a motor and a sensory root and ganglion. Its ganglion, the geniculate, is situated at the entrance to the aqueduct of Fallopius, in the depths of the internal auditory canal. This structure contains cells of the so-called spinal type, and is the homologue of the Gasserian ganglion and the posterior root ganglia of the spinal cord. There passes from it centripetally the nerve of Wrisberg (Fig. 2) on its way to the medulla oblongata, lying between the 7th and the 8th nerves. This represents the sensory root of the 7th. The distal or peripheral branches of the ganglion are three in number (Fig. 1).

1. The great superficial petrosal nerve; passing to Meckel's ganglion on the second division of the 5th, giving off in its course a branch which enters into the formation of the tympanic plexus (*the great deep petrosal nerve*).

2. The small superficial petrosal nerve; which passes to the otic ganglion on the third division of the 5th, likewise giving off in its course a branch to the tympanic plexus (*the small deep petrosal nerve*).

3. The external petrosal nerve, which enters into the formation of the carotid plexus of the sympathetic system.

In addition to these three divisions on the distal side of the ganglion, sensory fibres are also found coursing in the facial nerve proper in its passage through the Fallopian canal (I would recall, in this connection, the frequency of ear pain in cases of Fallopian neuritis of the 7th nerve). Furthermore, the nerve of Wrisberg, just above the ganglion, is connected with the auditory nerve proper by several fine filaments (Fig. 2).

The Plexus Tympanicus (Fig. 1),
in addition to the great and small deep petrosal nerves, both of which stand in relation to the geniculate ganglion, has entering into its formation the tympanic branch of the glosso-pharyngeal nerve (*Jacobson's nerve*), so that the tympanic plexus is composed of the terminal branches of Jacobson's nerve—from the 9th, and the small and large deep petrosal nerves of the sensory mechanism of the 7th.

In the medulla, the nerve of Wrisberg enters the fasciculus solitarius and terminates in the same manner and in close relation to the sensory roots of the 5th, 9th, and 10th nerves.

Zoster Zone.

The Zoster Zone of the geniculate ganglion, as shown by an analysis of the cases of herpes oticus, is to be found on the tympanic membrane, in the auditory canal, in the concha, and in an adjacent marginal area of the external ear. It is not to be inferred that this entire area in question is represented by the geniculate alone. The innervation of the interior of the auricle is a very complex one, the auricular branches of the trigeminus, of the cervical nerves, and the vagus participating; so that overlapping and great variability must necessarily result, but a study of the distribution of the eruption in

geniculate zoster teaches us that it must participate to a greater or less extent in the innervation of this area.

From this brief resumé it will be seen that the 7th nerve has the following sensory relations with the structures of the auditory mechanism:

1. With the *internal ear* by connecting filaments with the auditory nerve.

2. With the *middle ear* by petrosal branches to the mucous membrane of the tympanic cavity.

3. With the *external ear* by cutaneous fibres passing to the tympanic membrane, the auditory canal, and the interior of the auricle.

I therefore believe that the geniculate and its peripheral divisions play a central and important part in the innervation of the structures of the auditory mechanism; at the same time recognizing the part played by the auricular branches of the trigeminus, glosso-pharyngeal, vagus, and cervical nerves in the complex innervation of the same area.

Symptomatology of Otalgia.

Otalgia, as its name implies, is a neuralgic affection of the ear. The pain may be more or less constant in character, with exacerbations, or it may assume a distinctly intermittent type (*otalgia intermittens*). It may be localized in the depths of the ear, in the auditory canal, or on the surface of the auricle itself, and in some cases has been associated with hyperæsthesia and vaso-motor changes. A *Valleix* tender point is occasionally present in front of the anti-tragus.

. Some general idea of the frequency of this affection may be obtained from the statistics of Schwartze, who gives the relative frequency of nervous to inflammatory earache as 1.8 per cent. The recognized clinical types are: *primary* or *idiopathic*, *reflex* or *referred*, and *secondary* or *herpetic*.

Idiopathic Form.—These primary cases are apparently quite rare, only a few observations are found scattered

through literature. The etiological factors mentioned in the recorded cases were as follows. Scarlet fever (Nottingham), malaria (Delcourt), influenza (Eitelberg), lead (Kretschmann), trauma (Szenes), and exposure to cold. A case of otalgia intermittens has been described by Eitelberg in the case of a man aged twenty, who for three months suffered from a periodical pain in the ear, coming on at ten o'clock every morning and lasting one hour. It responded promptly to quinine. A classical description of idiopathic otalgia was given by John Nottingham as early as 1857, under the title of tic douloureux of the ear, from which I quote as follows. "A very interesting case of neuralgia of the tympanum, or tic douloureux of the ear, has lately come under my notice in a young gentleman of ten years of age. The patient has a highly nervous temperament, sensitive and excitable, characterized by a fine cerebral development, and very superior intelligence. The painful affection of the right ear from which he now suffers followed an attack of scarlet fever which he had about seven months ago. Watching the case attentively, a few days since it was observed that a violent although momentary attack of pain occurred nearly every five minutes. Occasionally the interval was less, sometimes a little more; the pain is most lancinating and acute, causing the patient to jump up in his chair, and often to bound across the room, and to throw himself into the arms of his mother in the most frantic manner possible. As soon as the shock of pain is felt, a blush of redness displays itself upon the external ear, which gradually passes off before the next paroxysm occurs. The attack of pain is remarkably sudden, and its cessation is equally so, and it is particularly worthy of notice that the patient is in an instant completely freed from his agony, and at once resumes his previous occupation or amusement, as if no recollection continued of the writhing torture which has just passed off. This sudden attack, and as sudden arrest of

the pain, are very unlike any of the ordinary phenomena of otitis, and are not accompanied by the anatomical appearances or physical signs which characterize inflammatory affections of the ear."

Reflex Otalgia.

This is a very common affection, and generally accompanies and is dependent upon some gross lesion in the buccal cavity or naso-pharynx. Perhaps the most frequent cause is a carious molar tooth. Among the other numerous etiological factors of this reflex pain may be mentioned: periostitis, and deep-seated inflammatory affections of the teeth—especially the molars and wisdom teeth; tonsillitis, and other inflammatory and ulcerative affections of the throat; tumors and ulcerations of the tongue and epiglottis; retro-pharyngeal abscess. Affections of the articulations of the jaw also may give rise to otalgia, and Kretschmann in 84 cases found 20 of articular origin. In these cases, on the side of the lesion there is felt pain in the depths of the auditory canal. This may be aching or neuralgic in character, and is not infrequently exaggerated by making pressure on the diseased part. It disappears, often with great rapidity, after the removal of the local cause. Sometimes with the pain there is a feeling of fulness and discomfort in the ear. Gradenigo, in his studies, found that the reflected pain from otalgia was not centred in the depths of the ear, but was localized near the tragus, and occasionally in the auricle.

Double Reflex Otalgia has been observed by Wagenhauser (*A. f. O.*, vol. xxvii., p. 171) in ulcerative affections of the throat and epiglottis. A curious and, so far as I am aware, a unique case has been described by Delavan, of a persistent *crossed* reflex otalgia. In this case a right-sided otalgia of long duration was relieved by removing the diseased roots of a left lower molar tooth. It will be observed that the area giving rise to reflex otalgia is in the distribution of the second and third

divisions of the trifacial nerve. It will be remembered that both of these divisions stand in relation anatomically with the geniculate ganglion of the facial; this being affected through the medium of the great superficial petrosal nerve (which passes to Meckel's ganglion on the second division of the 5th) and the small superficial petrosal (which passes to the otic ganglion on the third division of the 5th). It is by these anatomical routes that the stimuli reach the geniculate ganglion and the pain is then referred to its peripheral representation. Examples of referred or reflex pain are to be found in many other nerve distributions, and I would particularly emphasize in this connection the occurrence of referred pain in diseases of the viscera. It seems to me very probable that in this form of otalgia we are dealing with a referred visceral pain, the focus of irritation being situated in the mouth or naso-pharynx in the trigeminal area, and the pain being reflected into the sensory area of the geniculate ganglion; the connections mentioned between the second and third divisions of the 5th, Meckel's, and the otic ganglia, and through these ganglia with the geniculate by way of the great and small petrosal nerves, serving as an anatomical basis.

Secondary Otalgia (Herpetic Otalgia).—As its name implies, these cases are secondary to an organic lesion of the nerve or its ganglion, and in the case of herpes oticus is dependent upon an herpetic inflammation (posterior poliomyelitis) of the geniculate ganglion. These pains, as in idiopathic or reflex otalgia, are referred to the depths of the ear, the canal, and the auricle. It must, however, be emphasized that more than one ganglion is frequently involved in zona, so that herpetic pains may also occur in the other nerve distributions of the auricle, and be dependent upon lesions in the Gasserian or 2d and 3d cervical ganglia.

Tabetic Otalgia.—As the 7th nerve is a mixed nerve in the sense of the 5th, 9th, and 10th cranial nerves, it would

only be natural to look for its involvement in cases of tabes dorsalis, especially in the cephalic or bulbar types of this affection. In the event of such a localization, one would expect lancinating pains in the depths of the auditory canal. The occurrence of lancinating pains in the ear is mentioned in the comprehensive studies of Topinard (*De l'ataxie locomotrice*), and by Pierret (*Essai sur des symptomes cephaliques du tabes dorsalis*).

I have, with this symptom in view, examined a large number of tabetics, and succeeded in finding three cases in which sharp shooting pains were felt in the depths of the auditory canal, having the same character as the lancinations in other distributions. In all these cases organic affections of the ear were excluded. These observations are only clinical, but it seems to me very probable that careful studies of the nerve of Wrisberg will show degenerative changes when this symptom is present. Of course, as the 9th, 10th, and 5th cranial nerves, as well as the auricular branches of the cervical plexus, are also concerned in the innervation of this area, ear pains may accompany degenerative changes in them as well, but sharply defined recurrent lancinations in the depths of the ear may very justly give rise to a suspicion of degenerations in the nerve of Wrisberg.

Reflex Aural Neuroses.—Under this heading are described in otological literature some peculiar symptoms, centred about the auditory mechanism and apparently of reflex origin. They are sensory, vaso-motor, and trophic in their nature. In one group the source of irritation is in the auditory mechanism, and the symptoms are projected into the trigeminal area. In the other the irritative focus is in the trigeminal distribution, and the symptoms are referred to the auditory mechanism.

I will not take up a discussion of these symptoms in detail, but will again emphasize the anatomical relations existing between the facial nerve and ganglion and the trifacial nerve and its ganglion, through the medium

of the great and small superficial petrosal nerves. I would, however, call especial attention to a relation which exists between the teeth and the sense of hearing. It is an old observation that loud and shrill sounds are accompanied by a sensation of pain or discomfort in the teeth; *vice versa*, there has also been noted (Hesse, Risien Russell, and Mummery) deafness accompanying affections of the teeth; the auditory disturbance disappearing promptly on removal of the diseased focus. Gruber observed also hyperacousis, which disappeared on removal of the affected teeth. Here is a very interesting connection between the function of hearing and the second and third divisions of the 5th nerve. It will be recalled that the geniculate ganglion has also filaments of communication with the acoustic nerve in the auditory canal, and the same path which conveys the referred pain in affections of the teeth may also carry stimuli inhibiting the functions of the auditory nerve.

REMARKS.

In the foregoing pages I have given a brief resumé of the literature of otalgia, its recognized clinical types, and the prevailing views regarding its origin and anatomical relations. Very briefly, too, I have touched upon the embryology and anatomy of the facial nerve and its close relation to the auditory mechanism. Although the mixed character of the facial nerve has been accepted by anatomists for a number of years, no definite sensory functions have been attached to its sensory mechanism. At the present time we have not a clear and definite conception of that peculiar localization of neuralgia termed otalgia. Because of the complexity and overlapping of the auditory innervation, certain mixed forms of otalgia must occur. These belong rather to the auriculo-temporal neuralgia of the trigeminus, or are occipito-cervical otalgias; not, however, otalgia in the pure sense of this term. The pure and more sharply

localized form of otalgia is, I believe, essentially a manifestation of the sensory system of the facial nerve.

It may be said that the glosso-pharyngeal nerve, which sends a tympanic branch to the tympanic plexus, may also be one of the underlying factors in otalgia. In answer, I would mention the other sensory branches of the 9th nerve: to the tonsil, to the palatal arch and pharynx, and the fact that this area is not involved in the pure forms of otalgia. Of course, I cannot deny that the sensory system of the glosso-pharyngeal nerve may be the seat of a neuralgic affection, either alone or in conjunction with that of the facial. In such an event, however, one would naturally look for the distribution of pain in the throat as well, and not in the ear alone. The vagus, on the other hand, has only a small cutaneous representation on the auricle, and could therefore hardly be brought within the realm of otalgia except in a secondary or subordinate sense.

From our knowledge of the anatomy of the sensory system of the facial, together with the distribution of the pains and herpes, in cases of inflammation of the geniculate ganglion, the circumscribed aural distribution of this nerve may be fairly well assumed. Its branches to the auditory nerve, the tympanic cavity, the tympanic membrane, auditory canal, and interior of the auricle, cover fairly well the pain area in the pure form of otalgia, whether primary, reflex, or herpetic. The relation of pure otalgia in the referred type to the sensory system of the facial is quite apparent from the communication of the geniculate with the second and third divisions of the fifth nerve.

I would say in conclusion that the central and peripheral connections of the 5th, 7th, 8th, 9th, and 10th nerves are so numerous and so intimate that many careful clinical analyses will be required before deciding the exact rôle played by any one of these nerves in the production of otalgia. It, however, seems to me clear that

while the facial nerve may be by no means the sole factor, it is the preponderating one in the production of otalgia.

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Illustrating Dr. Hunt's article on Otalgia

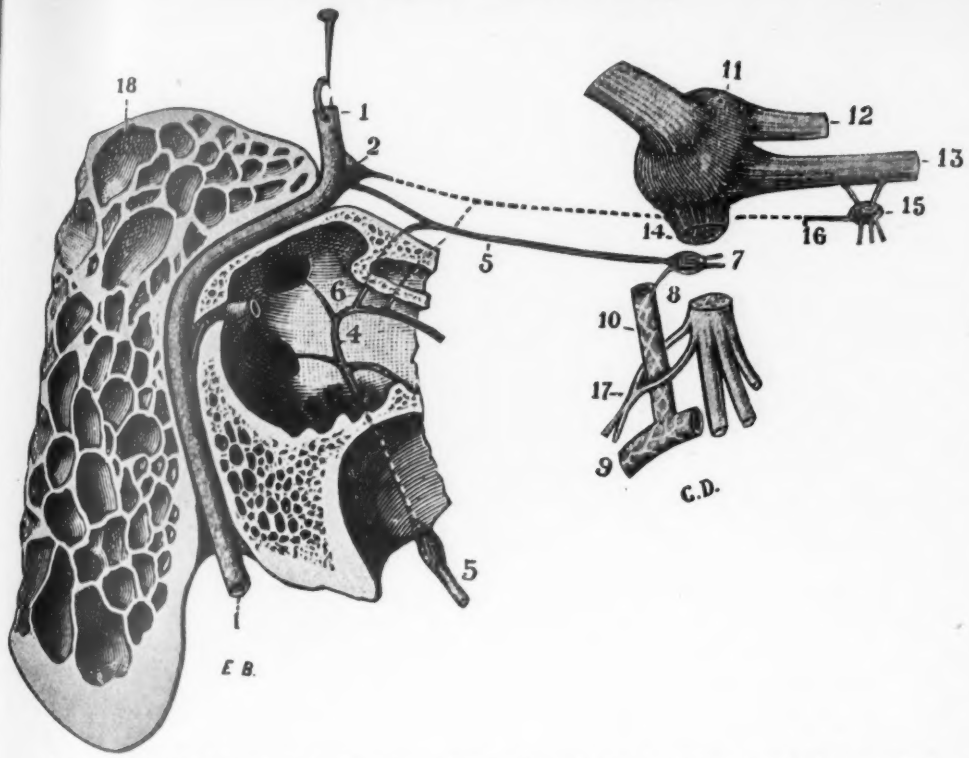

FIG. 1.—(*Testut's Anatomy.*) Showing relation of geniculate ganglion to Meckel's and the otic ganglia, and to the tympanic plexus.

1. Facial.
2. Geniculate ganglion.
3. Glosso-pharyngeal.
4. Jacobson's nerve.
5. Small superficial petrosal.
6. Small deep petrosal.
7. Otic ganglion.
8. Sympathetic ramus.
9. Internal maxillary.
10. Middle meningeal.
11. Gasserian ganglion.
12. Ophthalmic branch.
13. Superior maxillary.
14. Inferior maxillary.
15. Meckel's ganglion.
16. Great superficial petrosal and great deep petrosal nerves.

FIG. 2.—(*Testut.*) Showing anastomoses of the facial and auditory nerves.

1. Facial.
2. Auditory.
3. Pars intermedia of Wrisberg.
3'. Geniculate ganglion.
4. Internal anastomoses.
5. External anastomoses.

ON DEAFNESS IN THE COURSE OF ACUTE OSTEOMYELITIS AND OF SEPTIC PROCESSES IN GENERAL.

By Prof. SIEBENMANN, Basel.

Translated from the German Edition, *Zeitschr. f. Ohrenhlk.*, Vol. LIV., 1907, by Dr. Arnold Knapp.

THE following authors have observed a case each of deafness as a consequence of acute osteomyelitis: Steinbrügge (*Pathological Anatomy of the Ear*, p. 116), Bezold (*Deafmutism Based on Aural Observations*, p. 99), Wagenhäuser (*Arch. f. Ohrenheilkunde*, vol. 46, p. 33), and Castex (*Arch. Internat. de Laryngologie*, etc. 1903, p. 1383, and *Report of the Fourteenth International Medical Congress*, 1903, "Causes of Deafmutism," p. 31). These four publications are practically limited to clinical observation. Owing to the great rarity of this remarkable disease, a description of three additional cases which I have observed during the last five years may be of interest.

Case 1—A. H., aged twelve; 1903.

October 13, 1903.—The patient learned to speak at the proper time, developed mentally in a normal manner, also bodily, and enjoyed good health during her school years with the exception of a mild attack of measles. There were no evidences of hereditary syphilis. In May, 1897, the patient suffered from acute osteomyelitis of the left femur, and in November of that same year was discharged from the hospital with a suppurating fistula. In the spring of 1898 she

was again admitted to the hospital on account of recent pain and general swelling of the left thigh. On April 26, 1898, while the general condition was good and the hearing uninvolved, and without any preceding operation, the patient suddenly became deaf on both ears within four hours. This was not accompanied by any disturbance of sensorium or vertigo, vomiting, tinnitus, pain, or paralysis. A slight improvement occurred after a few months which has remained, so that the patient is now able to hear words and sentences spoken directly near the left ear.

The examination of October 14, 1903, showed excellent general condition; no syphilitic stigmata; bodily development corresponding to the age; no paralysis, no strabismus; normal gait. Pupils and eye-grounds are normal. The retronasal space is normal.

Ears: *Mt* quite normal.

Hearing { right = 0*cm* for conversation.
left = $\frac{1}{\infty}$ " " "

On speaking loudly into the right ear the patient becomes giddy. The functional examination of the hearing shows that there is no perception for either forks or pipes, and that this ear is completely deaf. The left ear appreciates weighted forks from "a^1" up; pipe tones up to Galton–Edelmann 10.8 = a^5 are perceived without any gaps. On rotation to the right as well as to the left, normal nystagmus is observed; the vertigo is more pronounced on turning to the left than to the right.

Case 2—J. F., aged forty-three; 1906.

December 1, 1906.—When 25 years of age the patient suffered from acute articular rheumatism, but otherwise enjoyed good health. In January, 1901, with severe headache and high fever, he suffered from cryptogenetic staphylococcic septicæmia with multiple purulent foci, which appeared at first in the femur, then in both tibias, later in the foot, the left sterno-clavicular and sterno-costal cartilages, in one rib, etc., and these at the present day are not all healed. The patient was kept to his bed for three years and underwent operations from time to time. During the first month there

was a constant fever (38–40° C.), with pain in the forehead and neck but without any distinct meningeal symptoms. In May, 1901, after several attacks of marked subjective tinnitus, the left ear became deaf preceded by periods of fear; then suddenly the left ear became totally deaf with a report like the discharge of a pistol. In July a number of sequestra were cast loose and the fever gradually diminished. The tinnitus became less. In January, 1902, the patient was able to resume work. Beginning with March, 1902, he suffered from severe attacks of vertigo lasting from ½ to 1 hour, without nausea, which were repeated at intervals of three to four weeks until February, 1904, then other osteomyelitic foci appeared in the foot, which were operated upon in October of the same year. From November, 1904, to December, 1905, there were repeated severe attacks of vertigo which recurred every two or three days and were made worse on motion. The pulsating subjective noises remained unchanged. In December, 1905, the headache and diarrhœa were increased, and the right ear, which had previously been normal, became suddenly deaf within a few days with marked subjective noises. At the same time intense vertigo and unstable gait set in so that the patient walked like a drunken person and could hardly support himself with the aid of a stick. In the summer of 1906 the gait and the hearing of the right ear improved and the noises diminished. The patient was then able to converse. The left ear remained deaf.

At present the gait is unsteady, especially in conditions of congestion following muscular effort or moderate indulgence in alcohol, and a sensation of rotation is experienced, with an appreciation of objects moving horizontally from right to left. This feeling of rotation is more marked at night. When the second ear became deaf, the patient was able to recognize persons on the street at distances of more than fifty metres only when he stood still. This was especially noticed when the patient's vision was turned to one side.

On *January 2, 1906*, Dr. Hug found the following: Right *Mt* slightly reddened; left normal. Hearing: right = 0.1*cm;* left, totally deaf. After catheterization the right improved to 5*cm.*

Weber's test a^1 in the better ear.

Rinne $a^1 =$ $\left\{\begin{array}{l} : +10 \\ : \\ : -\theta \end{array}\right.$

Lower tone limit = $\left\{\begin{array}{l} : \ {}^{E}-_{II} \\ : \\ : - \end{array}\right.$

September 8, 1906, the condition is unchanged. The hearing is not improved by catheter. Two months ago, after the tinnitus of a pulsating character had existed for two or three weeks, and the deafness had increased but without pain, a muco-purulent otorrhœa set in on the right side, which has persisted. Examination showed no signs of either acquired or hereditary syphilis.

Examination *December 1, 1906*. A rather thin, large, somewhat pale man; can only walk distances more than 20 metres with the aid of a stick. Pupils, eye-grounds, pulse, and temperature normal. The trunk and extremities present 8 bony scars which are situated on the sternum, the ribs, tibia, and foot. On the left tibia there is a deep groove.

Left *Mt* normal. Right: Retroauricular region and canal are normal; there is no sign of any swelling or tenderness; the drum is pink, partly covered with macerated epithelium. At the posterior and upper extremities there is a teat-like red, perforated protuberance from which a tenacious, cloudy discharge escapes. No perforation murmur. Staphylococci are found in smears and in cultures.

Hearing: Both o for conversation; words spoken directly into the ear are not understood. Fork a^1 is not perceived from the vertex. Functional examination shows that the left ear is totally deaf. The right still possesses some hearing. The upper limit of the hearing scale reaches up to 4.5 of the Galton–Edelmann; the lower is a. There are no gaps. On examining the right ear the vowels a, e, i, o, u, also T, P, R, and Sch when spoken directly into the auricle are correctly understood. Ö and Ü are occasionally confused with I; Z and S uncertain; M and N as well as the soft gutturals and labials are not perceived. No Romberg. With eyes open the patient cannot stand on one leg, though with the eyes closed and feet close together he can jump forward and backward. The muscular power is symmetrical, normal. Patellar

reflex normal. Walking with closed eyes the length of a room is possible, but patient wavers if he has to walk greater distances even with the eyes open. On looking to the right, horizontal and rotary nystagmus set in which is increased on injecting cold water into the ear, but is unchanged when the water is warmed to 44° C. On looking to the left there are rapid, wavering nystagmic motions in the horizontal direction. Injections of cold as well as warm water into the right ear have no influence on the nystagmus. Turning to the right or to the left produces no vertigo and the nystagmic motions are but slightly influenced. On turning to the right with the head bent forward there is rotary disturbance without vertigo.

In the course of the following weeks after the perforation of the right *Mt* had been enlarged and the suppuration treated, hearing improved so that in the middle of December loud voices could be heard at the ear. On December 24th the suppuration had ceased and the hearing had increased to $\frac{1}{\infty}$ for whisper and 12*cm* for conversation. On December 28th whisper could be heard at 3*cm*. December 29th: Vertigo has disappeared; the patient can walk without his stick and can talk without the speaking-tube. The tinnitus on the right side is less pulsating and is not more marked than on the left. The right *Mt* is red but transparent. The posterior fold is poorly indicated; bulging has disappeared; the perforation opening has closed. Hearing on the right side for whisper 3 to 5*cm*. Fork a^1 can again be heard from the vertex. The lower tone limit has descended from a to a^1; upper tone limit is Galton–Edelmann, 6.5. The nystagmus has disappeared. The vestibular reaction to mechanic and thermic irritants is unchanged. The left ear remains totally deaf.

Case 3.—B. B., 1902. Born 1876. Mother died of inflammation of the lungs when fifty-six years old; father is alive and is now in his seventieth year. The patient is the fifth of six children; four of these are alive and in good health; one died at the age of 1½ years from an unknown cause. There is no history of miscarriages or abortions. The patient has always been healthy and has never suffered from any trouble with his eyes. No gonorrhœa or syphilitic infection. In 1900

there were abscesses on both sides of the neck; this was recognized as peristrumitis. In November, 1900, the patient was taken actually ill with high fever and delirium. Two weeks later the right clavicle and the left thigh bone were swollen and the abscesses which developed were incised. Four weeks later the patient was able to return home. The wound in the thigh healed, but the suppuration in the neck and clavicle required re-admission to the hospital in January, 1901, when the abscess was opened and a few weeks later a sequestrum from the right clavicle was discharged. In March, tinnitus appeared on both sides, and in May, during the course of these suppurations the hearing rapidly diminished with severe subjective noises, constant vertigo, and vomiting, and in ten days the patient was completely deaf. During this time he also complained of disturbance of vision and was unable to read for three weeks. The wavering gait improved in October, 1901. The fistulæ then healed, though the scars over the clavicle would frequently break open. In December, 1901, the patient was able to return to work. The subjective noises were less but had not disappeared in March, 1907. The vertigo was experienced up to 1902, generally in the evening and then later disappeared. There never was any discharge from the ears; there never was any rheumatic pain or paralysis.

Examination in January, 1902, showed a well-built man with numerous scars on the neck following a purulent peristrumitis; the clavicle on the right side presented an adherent scar; there was a deep scar on the inner surface of the thigh. The skull and teeth were normal. There was no disturbance of sensibility or motility. Patellar reflexes were normal.

Examination of the eyes: Vision, left, 1.0; right, 0.7. In the right, extensive disseminated chorioiditis; left, the same localized to the equatorial region. The foci are too large for retinitis pigmentosa; this is also excluded from the presence of yellowish plaques over which the retinal vessels are seen to pass. Examination in 1907 showed the process to be quiescent.

Ears: Both *Mt* normal, with the exception of an opacity posteriorly. Patient is deaf in both ears for all tones. Examination of the vestibular function shows that on rotation

to the right and to the left, as well as after the injection of cold and warm water into the canal, there is no sensation of vertigo or nystagmus.

In this case the osteomyelitis seems to have been caused by the persisting strumitis. It is impossible to say whether the abscess in the thigh was superficial or secondary to inflammation of the bone. The disseminated chorioiditis was probably caused by the septic infection.

These seven cases furnish us with only a small material; we will, however, endeavor to show that there are many corresponding features, and that it is possible to develop a general clinical picture of an osteomyelitic deafness.

As regards the age of the different patients, it generally occurred in youth, in individuals during the process of growth (7, 7, 7, 15, 20, and 24 years); one patient belongs to middle age (40 years). This corresponds to the fact that acute osteomyelitis is more frequently observed in the first two decades than in later life. There is no particular predisposition of either sex, at the same time among these 7 there were 5 males and 2 females.

In all 7 there was an acute ostitis beginning with high fever, which lasted many months and sometimes for years.

In 3 (Bezold, Siebenmann—Cases 2 and 3) there was multiple localization of the foci; in 4 there was only one bone involved, viz: the femur; in 2 the tibia, in 1 the humerus. This predilection of acute osteomyelitic processes to the long bones, and especially to those of the lower extremity, is in accordance with the experience of general surgeons.

As regards the affection of the ears it is noteworthy that in all the 7 cases the deafness was bilateral. The first signs of the deafness appeared always during the course of the bone suppuration, and in two cases (Steinbrügge, Wagenhäuser) during the first febrile period, not during the first days but during the first weeks of the bone disease. In three others (Bezold and Siebenmann—

Cases 1 and 3) a year intervened between the bone suppuration and the inflammation of the ears. Castex's patient became deaf during convalescence, three years after the beginning of the disease. While in these 6 patients the deafness appeared simultaneously in both ears, the course of our second case was quite unusual, viz: five months after the onset of the osteomyelitis in the febrile stage, one ear became affected; after $3\frac{1}{2}$ years, in an afebrile period, and after other osteomyelitic foci had appeared, the other ear was involved.

In the cases of Wagenhäuser and Bezold, an operation performed in narcosis seemed to have started the process in the ear; in the case of Steinbrügge meningeal disease seems to have been responsible, while in Castex's patient and in my three cases there was no particular inciting factor.

The progress of the loss of hearing is usually very rapid. In my three cases deafness occurred within a few hours or days in normal ears. In the other cases there was at first marked deafness which gradually became complete in three months in Wagenhäuser's case, and in two years in Steinbrügge's case. In Bezold's case complete deafness was observed 5 years later though the hearing, as in my cases Nos. 1 and 2, later improved. The final result of the process was total bilateral deafness in 4 cases; in the remaining 3 the deafness was complete on one side, while there were hearing remnants on the other—$\frac{1}{2}$ octave (Bezold), 4 octaves (Siebenmann—1) and 8 octaves (Siebenmann—2).

The two patients of Bezold and Castex who became deaf in their seventh year, later became deaf-mutes. This feature suggests the question whether osteomyelitis should not be regarded of etiological importance in deaf-mutism, and whether the few cases of this kind, with the exception of the two above, have not been incorrectly regarded as tuberculous, scrofulous, or syphilitic. This only can explain why in accurate and large statistics,

like those of Lemcke and Uchermann, not a single case of osteomyelitic deafmutism is recorded.

Subjective noises were observed in three (Wagenhäuser, Siebenmann—2 and 3). They appeared simultaneously with the onset of the deafness and persisted. In our second case the character was severe and pulsating.

Vertigo was observed as a persistent symptom of irritation or defect in those three cases where there were subjective noises. The former appeared somewhat earlier than the latter; in our third case there was an interval of 2 months, in Wagenhäuser's case 3 months; in our second case a year intervened. While in the last case the vertigo diminished, in Wagenhäuser's case and in my third case it later disappeared. A peculiar symptom was presented by my first patient inasmuch as the vertigo only appeared when the right ear was talked into. It is not possible to say whether tinnitus and vertigo did not appear in the cases of Steinbrügge, Bezold, and Castex. Our cases show that these symptoms may be absent, but in other cases may be so persistent and intense that they are associated with vomiting and continue for years.

The static function was examined in our three cases. This showed that the static sense was preserved in proportion to the auditory sense. When there were hearing remnants the reaction to the rotation-experiment was normal; in the third case, one of bilateral total deafness, the reaction to mechanical and thermic influences was absent. Our second patient showed the presence of simultaneous conditions of irritation and paralysis—a well-known symptom in other nerve lesions. On turning the eyes to one side, nystagmic motions spontaneously appeared. The vestibular and semicircular-canal reaction of the partially deaf ear was reduced for thermic and mechanic irritations, but was absent in the totally deaf ear.

In all 7 cases the middle ear escaped. In our second case, after 5 years there was an acute perforating purulent

otitis. The marked increase of the vertigo, the subjective noises, and the deafness during the existence of this suppuration make it probable that this was also a metastatic osteomyelitic process with involvement of the perilymphatic spaces, as the otitis began in a painless, torpid manner and staphylococci were found in pure culture in the middle ear. The endolymphatic cavity was generally only indirectly involved, because the hearing, after the middle-ear suppuration had ceased, returned to the normal.

As regards the nature and the anatomical site of this process in the ear, the history and the results of the functional examination in all the cases point to an infection of the internal ear. We know that a series of infectious diseases may cause an inflammation of the nerve and of the membranous labyrinth through the agency of the circulation. Both of these may have been effective in our cases. The osteomyelitis in none of these 7 cases invaded other nerves than those of the cochlea and vestibule. This, however, is not sufficient to rule out a polyneuritic infectious or post-infectious process, for it has been shown by others and ourselves that in tuberculosis and in typhoid, just as after the action of certain poisons like quinine and salicylic acid, the polyneuritic process may be localized to the auditory nerves. Other infectious diseases, like syphilis, may even invade the labyrinth or the nerve primarily.

As to the pathological changes and their origin, there is but one autopsy report and that was published by Steinbrügge. In this case the bone of both petrous pyramids was unusually sclerosed, the soft parts of the labyrinth were destroyed, and the lumina of both scalæ contracted or occluded, partly by connective tissue, partly by bony tissue originating in the endosteum. On one side the semicircular canals are contracted by deposits of bone and the membrane of the round window is ossified; the labyrinth nerves with their ganglia are

partly replaced by connective tissue. As Steinbrügge himself says that these changes are probably meningeal with reference to the previous history, and as in the 7 cases remnants of the vestibular or cochlear function could be demonstrated, it seems that further pathological examinations must be made in order to decide this question.

The possibility of the metastatic lodging of septic material in the labyrinth must be considered. This supposition is probably incorrect. Metastases in the inner organs are much less frequent in staphylococcus septicæmia than in the infection with streptococcus. In the majority, *i.e.* ⅘ of our cases, there was only a single suppurating focus in the bony system, and aside from the case of meningitis of Steinbrügge, no internal organ was secondarily involved. It would be a very curious fact if the ear represented the only localization of metastases, and especially if these septic metastases should always occur on both sides and at the same time. In medical literature in general we have been unable to find examples of septic bilateral deafness. There are only two observations recorded; in both of these there was no bacteriological examination.

The one case was reported by Moos and this may possibly be among the cases of sepsis (Moos, *Wiener med. Wochenschrift*, 1863, p. 661): "Prof. Friedreich has drawn my attention to a case of sudden deafness from embolism of the basilar artery; in this case there existed during life an endocarditis." Another case was observed by Wendt ("A Possible Embolic Process in the Mucous Membrane of the Tympanum"—*Arch. f. Heilk.*, vol. xiv., p. 293):

A girl, twenty-three years old, died under pyæmic symptoms after the extirpation of a cystosarcoma of the left scapula. Five days before death she had suddenly lost the hearing of the right ear; during the last two days there has been no hearing on the left side. She was not able to understand

loud cries, nor was the watch perceived on application to the auricle or to the bones of the head. At autopsy abscesses were found in the lungs and spleen. The brain as well as the labyrinth, auditory and facial nerves, and the internal auditory artery are normal on both sides. There is nothing said about the microscopic examination of these parts. The tympanum contained a sero-mucoid fluid. The mucous membrane was universally swollen, pale; there are numerous hemorrhages to be found on the labyrinth wall near the windows and the mouth of the tube.

The author explained the clinical appearance by the occurrence of an embolism of the tympanic blood-vessels. This, according to the autopsy report cannot hold for the right ear, and is not probable in the case of the left ear. In the first place, a complete destruction of the auditory and of the labyrinth function occurred because the patient was entirely deaf and the perception through the bones of the head was interrupted. The macroscopically negative condition of the labyrinth is interesting, but does not change the diagnosis based upon the functional examination, and only shows that there was no purulent or hemorrhagic form of labyrinthitis, and that it is possible that primary changes occurred in the auditory nerve.

In my studies on the neuritis and polyneuritis of the auditory nerve in cancer cachexia and in tuberculosis, I have shown that this infection can be divided into three main groups similar to that of the clinicians—infectious, constitutional, and toxic, and that sepsis is of importance in the pathology of the auditory nerve. Prof. Kocher, who has had a large experience especially in osteomyelitis, tells me that as far as he can remember he has never observed deafness or severe paralysis of the other sensory nerves in osteomyelitis or in sepsis. Prof. Enderlen has said the same thing.

Neuritic and polyneuritic conditions appear to be very unusual in septic processes. Remak says in a compara-

tively small number of cases neuritic and polyneuritic symptoms followed long-continued suppurations; generally the suppurative process is situated in the skin or in the subcutaneous tissue after traumatism; more rarely after suppuration of the inner organs. All cases have one feature in common, that the polyneuritic symptoms occur weeks or months after the onset of the suppurating process and not always in the primarily affected limb. Most frequently the amyotrophic variety with severe emaciation and great prostration is observed. The prognosis is not unfavorable in most cases; the paralyses disappear, as opposed to the osteomyelitic deafness in which no improvement occurs. According to Kraus, after the study of a few cases of septic polyneuritis, the vagus, facial, abducens, and motor nerves of the tongue are the most frequently involved of the cranial nerves. It is not without interest that of the previously reported cases persons of middle age have been attacked, and that women are more frequently affected than men; both conditions, as we have seen, do not hold for the osteomyelitic deafness.

In our 7 cases of osteomyelitic deafness, only one was examined bacteriologically; this showed the presence of a pure staphylococcic infection. It is well known that in acute osteomyelitis of the long bones this bacteriological condition is the usual one. I have endeavored to search the literature for instances of disturbances of the nerves experimentally, by staphylococci or their toxins. According to Kolle and Wassermann, Sander has studied the action of the staphylococcus filtrate on the nervous system, and has found that in two rabbits dead from staphylococcus toxins, there were evidences of acute cell changes, less marked, however, than when the infection occurred with living toxins. Disturbances of the nerves through endotoxins, *i. e.*, poisons of dead staphylococcus cultures, are not known. In the injection of living staphylococci into the venous trunks, changes are found

in the axis-cylinders of the gray and white substances of the spinal cord, while the peripheral nerves remain intact. Dr. Sander found changes in the ganglion cells of the brain in the form of Nissl's acute cell disease, especially in the motor nuclear regions of the trunk of the brain.

The neuritic and polyneuritic diseases of the optic nerve can be grouped in a similar manner to those of the auditory nerve, as the same poisons, the same constitutional anomalies, and the same infectious diseases occur. As the ophthalmologists have extended their researches in this direction very much farther than the otologists, the study of the septic diseases of the eye in general seems of importance. Cases of osteomyelitic blindness and diseases of the eye following osteomyelitis are not spoken of in surgical or ophthalmological literature, while other septic processes are very frequently encountered in the etiology of eye diseases. "Hardly an organ," says Lenhartz, "is so frequently affected in septic processes as the eye." Hemorrhages have been observed in the eye-grounds in 30%, septic retinitis in 10%, panophthalmitis in 4 to 23%, though the latter has never been observed in staphylococcus sepsis; the infection is always due to streptococci and the patient is in advanced years. Rarely inflammation of the papilla was observed. Lenhartz has observed an optic neuritis in a chronic streptococcus endocarditis which proved fatal. This author described a case of cryptogenetic streptococcus sepsis with symptoms of acute polyneuritis of both lower extremities. Experienced ophthalmologists regard septic neuritis of the optic nerve as a very unusual disease. Uhthoff does not even mention this condition in the material which he has collected; Groenouw confirms this. After erysipelas, however, 2 or 3 cases of optic atrophy have been observed in which the indirect infection through the blood-circulation is assumed. Michel observed septic emboli in the optic nerve in two cases and Snell in one.

Just as unusual as a septic neuritis of the optic nerve seems to be, so frequent is panophthalmitis. Bilateral affection, according to the general consensus of opinion, occurs in $\frac{1}{3}$ of the cases, and generally both eyes are affected at about the same time. We may, therefore, assume the probability that in osteomyelitic deafness there is an inflammation first of the labyrinth and not of the nerve; at the same time, carrying the comparison between the eye and the ear still farther, the changes in the ear are represented by a more or less diffuse destruction of the labyrinth, more severe than the septic retinitis which occurs so frequently in the eye—$\frac{1}{3}$ to $\frac{2}{3}$ of all cases.

The fact that most patients who suffer from double-sided panophthalmitis following sepsis generally die, and only about 10 cases are known to have survived, may help to explain the rarity of osteomyelitic deafness, because those who are severely affected with osteomyelitis probably die, and the deafness is not recognized in the last days owing to the general condition of stupor. Moreover, of the patients in whom the ophthalmitis is the only metastasis only 25% die. It would seem well worth while, in the cases dead of staphylococcus sepsis, to carefully examine the labyrinth microscopically and bear in mind the possibility of a one-sided deafness through the septic process.

Our assumption that the labyrinthitis and not the neuritis is the cause of the osteomyelitic deafness is supported by the fact that both divisions of the labyrinth are involved to about the same degree. This is further confirmed by the autopsy report of Steinbrügge, and this is a much better explanation for the deafness than the meningitis.

The fact that in osteomyelitic deafness occasionally marked remnants of the auditory and the static function are found, suggests the condition of the labyrinth found in meningitic deafness. Moreover, the fact that during

the course of the osteomyelitic deafness no perforation from the labyrinth to the middle ear has been observed, agrees with the clinical and anatomical experiences which have been collected concerning the meningeal labyrinth suppuration. With the exception of Steinbrügge's case, meningeal symptoms were absent in our 7 cases of osteomyelitic deafness; for 2 of my 3 personal cases at least this seems absolutely true.

This condition resembles that form of deafness which is observed in hereditary syphilis much more than meningitic deafness. The two processes, however, are not identical. In my cases at least, the previous history and the general examination showed not the slightest ground for this supposition, and this is probably true for the other observers. The initial febrile period of the bone disease, with its typhoidal character lasting for days or weeks, is extremely characteristic, and the deafness follows osteomyelitis much more promptly than in hereditary syphilis.

Finally, it seems that the same destructive action which the streptococcus exerts in septic ophthalmia is furnished by the staphylococcus for the labyrinth. Pyogenic staphylococci, which generally form fewer metastases than pyogenic streptococci, seem to be particularly irritating for the ear, much more so than for the eye. It is impossible to say whether in these cases of labyrinthitis there was a new bacterial invasion. In the majority of cases of bilateral septic panophthalmitis there seems to have been a more direct toxic inundation than a toxic action. This seems probable because the deafness generally is bilateral and simultaneous and because the time at which the deafness occurred in half of the cases was long after the febrile stage had passed; in two, in fact, after years. On the other hand, these observations seem to confirm the opinion of the unusually long existing virulence of staphylococci and their toxins in the human body.

A FATAL CASE OF SINUS THROMBOSIS, AFTER CHRONIC PURULENT OTITIS COMPLICATED WITH CHOLESTEATOMA, ILLUSTRATING AN UNUSUAL VARIETY OF INFECTION.

By ARNOLD KNAPP, M.D.

Previous History.—The patient, a boy of eight, suffers from kyphosis. There had been discharge from his right ear for three years. Severe headache and vomiting, which had existed for several months, were relieved by the extraction of polypi three weeks ago. The urgent advice of the surgeon to have the ear operated on was not followed. Three days ago the headache returned with great severity, and with vomiting; the discharge had ceased. There were three rigors yesterday and one to-day. The symptoms all pointed to a grave intracranial complication, and he was admitted to the New York Ophthalmic and Aural Institute on *February 1, 1906.*

On examination the right ear-canal was collapsed, the mastoid process tender, not swollen, the pain being marked below the mastoid tip and extending down the neck. Temperature 105° F. Pulse 140. Cerebration normal. Optic disks normal. Left ear normal.

Operation, February 1st.—On opening the mastoid cortex very fetid thin pus escaped from the dilated antral cavity which extended into the tympanum and contained broken-down cholesteatomatous masses. The inner end of the posterior bony wall was defective. There was caries in the attic and floor of the tympanum. There were no ossicles. The mastoid cortex was entirely removed. The underlying bone seemed soft, though there was no fistula. The sigmoid sulcus

was opened. The sigmoid sinus had retracted from the bone, and the cavity thus formed was filled with a serous fluid. The bony sulcus was then completely removed, backward beyond the knee and down toward the bulb, where the wall of the sinus seemed healthy. The sinus wall was soft and presented no granulations; it was of a yellow-black color. On making an incision into the sinus the parietal wall was unusually tough and thickened. The lumen contained a disintegrated clot, thin serous pus, and gas. The gas had the same odor as an appendicular abscess. After removing the clot the sinus collapsed. On following the clot posteriorly it became apparently normal, and its removal was followed by free hemorrhage. The inner wall of the sinus was normal. The clot near the bulb seemed healthy and was therefore left undisturbed.

On the following day the condition was fair, cerebration clear, the temperature rose to 103°.

On *February 3d* the temperature still remained at 103°. There was a slight chill in the morning. Some tenderness in the neck; the glands were swollen. The optic disk showed some congestion; the lungs seemed normal. It was decided to ligate the internal jugular vein, which was then done, together with removal of the enlarged cervical glands and the ligation of the facial and thyroid veins. On dissecting the vein upwards at the level of the hyoid bone it was found adherent and the wall inflamed, though it contained fluid blood. The mastoid wound was then rapidly inspected. It seemed to be perfectly clean except for some pus in the posterior part of the antrum directly internal to the sinus. This area of bone was removed. The bulb was then further exposed and the clot removed with a curette. The dome of the bulb seemed to be about an inch distant. There was some bleeding. The clot removed from the bulb was not disintegrated and of good color. On lifting the plug in the lateral sinus a gush of blood resulted. The wound in the neck was closed with adhesive straps.

On *February 4th*, the temperature was down to normal. In the evening it rose to 101°.

February 5th, on changing the dressing the dura internal to the sinus seemed purulent and discolored. On removing

the gauze from the jugular bulb, chocolate-colored pus, with some odor, escaped.

On the following day the temperature was 102°. There was considerable cough. The bulb seemed clean. The jugular vein was incised and slit up. The physical signs of a pneumonia increased. The temperature remained up, though the wound was perfectly clean. Respirations 50–60.

After four or five days of the same clinical picture with gradually increasing cyanosis, difficulty in breathing, and tracheal râles, death ensued.

After death the wound was inspected and the temporal bone, including the jugular bulb, removed. The jugular bulb contained a moderately discolored clot. The walls were apparently healthy. There was no meningitis.

The point of special interest in this case was the variety of infection found in the sigmoid sinus. Clinically and bacteriologically the infective agent belonged to the proteus-aërogenes group, a mixed infection characterized by the formation of gas. It is well known in general surgery that this combination constitutes the putrefactive form of infection which is extremely virulent. In sinus thrombosis secondary to mastoiditis it has chiefly been observed in chronic purulent otitis with cholesteatoma. Under these circumstances the jugular vein should have been ligated at the first operation. The septic pneumonia might then have had a favorable outcome, though the kyphosis was an unfortunate complication.

REPORT OF TWO FATAL CASES OF BRAIN ABSCESS.[1]

By J. J. THOMSON, M.D., New York.

I HAVE taken the liberty of reporting the following cases of brain abscess on account of some points they presented illustrating the difficulty of accurate diagnosis at an early stage, and because one showed clearly the site and nature of the lesion, while the other gave practically no indication of the position of the pus accumulation.

Case 1.—A sturdy young man eighteen years old, who with the exception of his ear trouble enjoyed remarkably good health. The family history was good, the parents both living and well.

About five years ago the patient was operated on for double mastoiditis. The healing of the wounds was rather protracted. During this convalescence his physician was taken ill, and he came under my observation. At that time the right ear did not show any tendency to heal, although about four months had elapsed since the original mastoid operation. A radical operation was performed and this ear gave no further trouble. The mastoid wound on the left side healed after treatment for six weeks or so. With the exception of an attack of furunculosis in the left canal, and repeated attacks of otorrhœa in the same ear, he had had no trouble until about March of the present year. He complained at that time for only one day of dizziness which entirely disappeared after

[1] Read at the meeting of the Otological Section, N. Y. Acad. of Med., Oct. 11, 1907.

a day in bed, and I did not hear any more of him until June 11th.

On that day he was seized with severe pain in the head, most marked on the left side and centring over the scar of the mastoid wound. He stated that two nights previously he had had a chill lasting several minutes, but felt sufficiently well to be about in the morning. There was a profuse discharge from the auditory canal, and the mastoid was quite sensitive to pressure. The temperature ranged from 99° to 99½°, and the pulse was about 90. The pain was the most marked feature at this time, and was distinctly more than is usually associated with an attack of mastoiditis, requiring full doses of morphine to control it. This condition continued without change until June 14th when a slight swelling appeared above the auricle, and the mastoid was more tender. Temperature 100°, pulse 110. A radical operation was performed on this day. The cavity of the previous operative field was filled with disintegrated granulations, covered with a shell of bone. The middle ear was also filled with granulation tissue, and the necrosis in the bone extended to the dura above the mastoid antrum. The dura was freely uncovered, but no indication of meningitis could be discovered. The lateral sinus was also uncovered, but did not present a pathological appearance. On account of these exposures, and the suspicious pain which existed before the operation, I decided to leave the posterior wound open, and defer the plastic operation until a later date. Immediately following the operation the head pain ceased, and the patient was very comfortable until on the fourth day he experienced a severe chill, with a rise in temperature to 104½°, the cause of which was soon apparent in a rash and cellulitis which involved not only the area of the wound but the entire face and scalp. This kept the temperature up for several days, but soon disappeared, and the patient did very well. At no time was there the slightest return of the pain in his head, and even during the time he had cellulitis he felt very well. At the end of about two weeks he went home. The wound granulated in a very satisfactory manner, and at the end of about ten days more he returned to the hospital for the plastic operation on the canal. Following this there was no eleva-

tion of temperature, or alteration of the pulse rate, and the young man felt as well as he ever did. At the end of a week he went home, and the same evening while playing cards was seized with a severe pain in the head, most severe over the frontal region. This was so severe that it would not yield to anything except large doses of morphine. The patient was returned to the hospital for observation. The temperature at this time was 99°, and the pulse 102, and he began to complain of photophobia. These with the slight temperature and headache were the only symptoms present.

On July 19th, two days later, the condition was very much the same. The temperature was 103½°, and the pulse 120. A careful examination failed to show another symptom. On July 20th no change was noted. There were no localizing symptoms, no Babinski sign, no rigidity of the neck or other muscles, reflexes were normal, no dizziness, nystagmus, or vomiting, and no ocular symptoms whatever. His mentality was not clouded in the least, and his co-ordination was apparently perfect as far as could be determined while he was in bed. The two predominating symptoms were still excruciating pain in the head and photophobia. The total leucocyte count was 6800, and the percentage of polymorphonuclear was 68. The urine showed nothing abnormal. There was no diazo reaction, and the Widal test was negative. His temperature on this day was 98°, and the pulse 90.

The case at this stage was very confusing to me, there being practically no symptoms of intracranial infection beyond the pain in the head, and this, taken in conjunction with a diminution of the leucocytes, and a normal temperature, and the pulse of 90, led me to look for some general invasion, possibly beginning with meningeal irritation or a serous meningitis.

On July 21st the patient passed the most restless day of his illness. He was mentally bright, showing not the slightest impairment of cerebration when in conversation. His pain was so severe, however, that he had to be closely watched in order to keep him from self-destruction by jumping out of the window. During the afternoon he was given 60 grs. bromide of soda, 20 grs. chloral, and ½ gr. morphine, and still his appeals for relief were pitiful. After midnight the patient slept for about five hours, and awoke feeling much relieved.

The leucocytes had increased to 7000 with a normal percentage of polymorphonuclears. He had had some retention of urine but voided without difficulty now, was free from all pain, and felt as well as he had at any time in the past six months, The temperature was 98½° in the morning, and 100° in the evening. On the following day his condition had not changed. He felt so well that he desired to get up and read a book to pass the time, and said he would get weak if he remained longer in bed. He did not complain of dizziness when sitting in bed, and the photophobia as well as the pain in his head had entirely disappeared. He had a slight distress in the abdomen, and passed large quantities of gas, and the examination of the urine at this time showed a considerable amount of indican. During the night the headache and photophobia suddenly returned, and on the following day his condition was the same as it had been several days previously. The headache was confined for the most part to the frontal region.

The following day a thorough examination failed to detect a single localizing sign. His mentality was perfect, there was no aphasia of any type, no paralytic manifestations connected with the eyes, or palate, or tongue, or any of the muscles of the trunk, no disturbances of sensation, no optic neuritis, and no nystagmus could be elicited even on extreme abduction of the eyes. His temperature had gone up to 102°, and his pulse was now only 98, and blood pressure 140. Another blood count proved to be normal the same as the last one. An attempt was made to do lumbar puncture, but owing to the nervous condition of the patient it was necessary to abandon it. His condition became so bad, and his pulse so rapid and weak, that nothing could be done without a general anæsthetic, and it was not thought to be advisable to resort to that means. He began to complain of frequent chilly sensations, and in fact had done so occasionally before but did not have a distinct rigor at any time. His heart now was irregular. It would beat rapidly for 20 or 30 beats, and then slowly for as many, varying a great deal in its rate within the same minute. No change in the condition was apparent until July 29th, the eleventh day since the onset of his pain for the first time. On the morning of that day I thought his

speech was a little slow, showing a tendency to drawl, although his cerebration was active and not impaired in the least. He also for the first time said he felt dizzy. There was no retraction of the head, or tenderness, or rigidity about the neck, and with the exception of the changes already noted, and the fact that he was growing weaker, the condition was the same as on previous days. He was seen in consultation by Dr. John D. Richards that afternoon at 5 o'clock.

A very marked change had occurred since morning. The patient was drowsy for the first time, though quite rational when aroused; there was a slight tendency to lie with the head retracted; the neck muscles were rigid, only slightly, however, when an attempt was made to bend his head forward. No localizing symptoms were present. Neither Babinski's nor Kernig's sign could be elicited. The reflexes were normal, the intra- and extra-ocular muscles did not show any variation from normal, the tongue was protruded, and the palate elevated symmetrically; there was no paralysis of any of the muscles, or areas of anæsthesia, no aphasia, and the eye grounds were still clear. A blood count made during the day showed 15,000 leucocytes with 92% polymorphonuclears. It was plainly apparent now that the patient was suffering from increased intracranial pressure whatever the cause might be. A second attempt was made to do a lumbar puncture without general anæsthesia, but it was unsuccessful on account of our inability to hold the patient in a suitable position. An attempt under nitrous oxide was also a failure, so chloroform was used, and 10*cc* were withdrawn. The fluid came a drop at a time, and the first portion on account of being tinged with blood had a cloudy appearance, but a specimen obtained in a second tube was perfectly clear, and was sent to Dr. L. B. Goldhorn, from whom the following report was received.

Fluid perfectly clear. Centrifuged, showed a few endothelial cells, no pus, no blood, no bacteria. Cultures on bouillon, agar, and serum incubated 24 and 48 hours were negative, The original fluid incubated showed no growth, fibrin or clot, and remained clear. The patient died at 10.30 the same night.

On autopsy a large cerebellar abscess involving the

entire left lobe, a portion of the central lobe, and encroaching on the right lobe was found. Its walls were not distinct and did not show any capsule formation. From its size, and the history of the case, I am inclined to think it was the cause of the head pain at the time of the radical operation, the relief following this operation being due to the temporary relief of pressure afforded by the exposure of the dura and sinus.

CASE 2.—This patient was a man fifty years old, who had always enjoyed good health, had no specific history, or family history bearing on the case.

He consulted me January 15, 1907, on account of deafness in the left ear which he had first noticed two weeks previously. He complained of absolutely nothing else. He never had any pain or headache, or noticed anything peculiar until his attention was drawn to the fact that he was not hearing well. On examination the left canal was found to be symmetrically swollen, so that no view could be obtained of the membrana tympani or fundus of the canal. He said he never had any ear discharge, or trouble of any other character, and there was no discharge apparent at the time of my first examination. The swelling in the canal was not tender to pressure, and traction on the auricle did not cause any discomfort. There was no mastoid tenderness, or elevation of temperature, or increase in the pulse rate. There was no preauricular tenderness or glandular swelling. An incision was made on the posterior wall of the canal, and also in the anterior wall. No pus was evacuated. The condition did not change for the next couple of weeks. The lumen of the canal remained the same, and there was no discharge from the ear. About Feb. 1st he began to complain of a dull pain on the left side of his head. This was not severe, and only troubled him at night. During the day he felt very comfortable and attended to his business, but found difficulty in sleeping at night. There was no increase in the temperature, no mastoid tenderness or tenderness in the canal. Percussion was negative. About Feb. 15th a slight swelling developed over the root of the zygoma, and this region was slightly

tender to pressure, but no amount of pressure on the mastoid would cause any pain, and there was still no discharge from the canal. After consultation it was decided to make an incision over the site of the swelling, believing that the condition was an external otitis. This incision evacuated about a drachm of pus. No fistula could be found leading into the bone, so after establishing a communication with the auditory canal, the wound was drained both into the canal and externally. It healed in a short time, and the pain on that side of the head was diminished, although not entirely relieved, and the canal remained occluded. The condition did not change for about a month. There was never any temperature or mastoid tenderness, no change in disposition or mentality, no discharge from the ear, and only on retiring did the patient complain of much discomfort.

On *March 16th* he presented himself with his mastoid and zygomatic region intensely swollen, red, and tender. That afternoon on opening the mastoid it was found to be entirely disintegrated, and filled with pus, which extended to the dura above the antrum, and also covered the sinus. Both these structures were heavily coated with granulations, and as there had been no symptoms of intracranial infection they were not disturbed.

The next day the patient showed a tendency to sleep a good deal, but was rational when aroused, the temperature was 99°, and the pulse 88. The blood count and urinalysis showed nothing abnormal.

March 18th.—Distinct aphasia was present. The patient was unable to say the name of any article shown to him, He designated everything by the same name, or rather by a meaningless sound, usually "tuh." He was perfectly familiar with the uses of objects, and only lacked the ability to name them. When shown an umbrella he said it was useful on that particular day, but could not call it by name, and was unable to write anything. With his eyes closed he could recognize objects placed in his hand, but could not call anything by name except money. He could tell the denominations of different coins without difficulty. He could carry on an intelligent conversation on any subject. There was no optic neuritis or muscular paralysis, and the reflexes were normal.

The intra- and extra-ocular muscles did not show anything. His pulse was 62.

March 20th.—His condition had become much worse. There was a slight facial paralysis on the right side, and also paresis of the right arm; the leg was not involved. There was beginning optic neuritis of the left eye, the speech was scanning, and replies to direct questions were slow. The blood pressure was 120*mm* during systole, and 105 during diastole. After consultation with Dr. J. A. Booth, Dr. E. G. Zabriskie, and Dr. W. C. Phillips it was decided to explore the temporo-sphenoidal lobe. After several unsuccessful punctures through the dural exposure in the mastoid wound, a small pus cavity was opened and about a drachm of pus evacuated. A rubber drainage tube was inserted and the wound dressed.

March 21st, the following day, the patient slept most of the time, but was rational when aroused. The pupils were widely dilated, and did not react to light or accommodation. The other symptoms remained the same.

March 22d.—Patient was considerably improved. The paralysis was not so marked in the face and arm. He was quite rational, not so drowsy, and discussed his case intelligently.

From this time on he gradually became more drowsy until complete coma occurred. The paralysis became more marked, as did also the optic neuritis, and he died March 27th. While dressing his wound on the day of his death, I made at least a dozen punctures in all directions in his temporo-sphenoidal lobe radiating from a point over the mastoid antrum, but failed to evacuate any pus from the abscess cavity that the autopsy showed to be present. On the day of his death his pulse fell to 58. The blood-pressure findings were taken by Dr. Lester M. Hubby, and on the various dates were as shown in the accompanying table.

	Temp.	Pulse.	Resp.	Systole.	Diastole.
March 19	98°	62	18	120*mm*	105*mm*
March 24	99.4°	88	20	112 "	90 "
March 25	99°	72	16	150 "	120 "
March 26	98.2	70	18	156 "	140 "
March 27	99.6	100	36	120 "	100 "

The autopsy made by Dr. Zabriskie showed an abscess cavity about the size of an English walnut situated about the middle of the temporo-sphenoidal lobe, and filled with thick creamy pus. This cavity was surrounded with the punctures which I had made prior to death, and although it could not be made out positively, it seemed that some of them must have punctured the cavity itself, but owing to the consistency of the pus failed to allow any to escape, notwithstanding the fact that in withdrawing the knife I made considerable downward pressure on the blade. As near as could be estimated from the walls of the cavity, the abscess had been in existence probably some months, and apparently did not communicate with the cavity emptied at the time of operation. The full report as submitted by Dr. Zabriskie is as follows:

Autopsy Report.—Autopsy performed 5 hours after death. Body well nourished. No external signs of violence. Rigor mortis well developed. Only examination of the brain was made. Large irregular incised wound behind the left ear extending upward and forward to one inch beyond the anterior border of the ear, which discloses the mastoid portion of the temporal bone entirely removed. On removing the brain, a large quantity of purulent fluid escaped. The dura is thickened and infiltrated and adherent to the brain surface in the region of the wound. Otherwise it is normal. The leptomeninges are thickened and infiltrated over the left temporal lobe, and extending downward toward the base of the brain. Everywhere congested and the vessels injected. Examination of the brain itself reveals a large abscess cavity the size of a small hen's egg which communicates with the exterior surface of the inferior temporal convolution about one and a half inches posterior to the tip of the temporal lobe. It runs backward and inward to within an inch of the lateral ventricle. The walls of the abscess cavity are thickened, show considerable connective-tissue proliferation, and round-cell infiltration. The surrounding tissue contains five or six easily discernible punctured wounds followed by capillary hemorrhages. The destruction of tissue being so great it is

impossible to determine how or in what manner the abscess was first formed.

The chief points of interest that these cases suggested to me were: the negative indications in the blood count in both cases; the difficulty of positive diagnosis in the first case; the relative value of puncture and exploration through the already existing mastoid wound in cases of suspected temporo-sphenoidal abscess, compared with that through a trephine opening over the superior or middle convolution; the fact that such a destructive lesion could exist in the cerebellum without giving more characteristic signs of trouble in that region.

ON THE PROGNOSIS OF THE OPERATIVE OPENING OF A PURULENT LABYRINTH.

By Dr. R. FREYTAG, Breslau.

(Abridged Translation from *Zeitschr. f. Ohrenhlk.*, Vol. LI., 1906.)

HINSBERG in his article on labyrinth suppurations states that the opening of the labyrinth is an indicated procedure and that the results encourage further investigations. I have carefully reviewed the cases of operations on the labyrinth which have been published since that date, in order to see whether this view can be supported.

On pages 341–343 in the German original there is a complete list of 102 cases where (1) an operation was performed on the labyrinth with recovery; (2) with fatal termination from the labyrinth operation; (3) with fatal termination notwithstanding the labyrinth operation; (4) with fatal termination from a complication existing before the labyrinth operation; (5) with fatal termination from a disease independent of the labyrinth suppuration; (6) of opening of the healthy labyrinth; and (7) with unknown termination. I did not include in this review the simple removal of sequestra.

It is well to follow Hinsberg's example and to separate the successful from the fatal cases. The latter are then redivided into (1) those in which death was produced by the operation in the labyrinth; (2) those in which the labyrinth suppuration led to death notwithstanding opening of the labyrinth; (3) those in

which the cause of death was independent of the labyrinth suppuration; (4) those in which a fatal complication existed before the operation in the labyrinth.

Of interest are those operations where a diseased labyrinth was exposed. To determine the danger of the operation, we must take away from the 20 post-operative fatal cases the 17 belonging to groups (4) and (5) and 2 cases of group (3) must also be excluded; 70 cases remain. In only one of these was death presumably brought on by the opening of the labyrinth. That means a fatality of 1.4%, which is very much smaller than that found by Hinsberg.

The regular opening of a non-infected labyrinth seems to be relatively without danger; 9 operations of this kind have been performed on account of Ménière's symptoms or vertigo without purulent otitis, and in all cases recovery took place—in one case notwithstanding secondary infection of the operative cavity. Though there seems to be no particular reason to dread the operation, it is important to determine whether the prognosis of a labyrinth suppuration is aided thereby.

This question can only be solved if we compare in a uniform material the mortality of the cases where the labyrinth has been opened with those where it has not been exposed. I think my statistics enable us to judge of the mortality of cases where the labyrinth has been operated upon. With 67 recoveries there are 2 cases in which a fatal complication was not determined before operation where the complication developed after operation, and one fatal case following operation. That makes 3 fatal cases, a percentage of 4.5.

It is much more difficult to determine the mortality of cases of labyrinth suppuration where the middle ear only has been exposed. The statistics on this question suffer from one grave error—all cases of labyrinth suppuration are judged of equal importance, whether they are extensive or circumscribed, as for instance a suppuration localized to

one semicircular canal. In Jansen's material, where isolated diseases of the canal apparently prevailed, the mortality was slight, 10%, according to his reckoning; while Whitehead, whose cases were all severe, had a mortality of 35%. If we examine the yearly report of the Halle Clinic, we also find very high mortality. Of the 24 cases which Friedrich has collected for his monograph, 11 succumbed to the results of a labyrinth suppuration, in other words almost 50%.

A uniform material is furnished by the cases of labyrinth suppuration with the formation of sequestra which were first collected by Bezold and later by Gerber. These are all cases of extensive severe diseases, in which Gerber found a mortality of 16.6%. This problem can only be solved if in future in all reports cases of labyrinth suppuration are divided into diffuse and circumscribed forms. If we should regard the figures of Jansen we find a mortality of 10% for those cases which were not operated on in the labyrinth, with a mortality of 4.5% for those which were operated upon. This comparison, however, is incorrect, and should be very much more in favor of the operation, if it is remembered that in the operative cases the disease is always a severe one.

I have examined the cases which were observed in the Breslau Ear Clinic since the date of Hinsberg's publication. These make together 46 cases. Of 16 cases of labyrinthitis which were treated only by exposure of the middle ear, 6 were healed, 2 died from causes independent of the labyrinth suppuration, and in 4 the labyrinth disease caused death. This gives us a mortality of 22%. In 27 cases the labyrinth was opened at operation. Of these, 7 were complicated before operation by fatal conditions (6 with meningitis, 1 with brain abscess), and one died from chloroform. These 8 cases can be excluded in determining the mortality. Of the remaining 19 uncomplicated cases, none died—so

that the mortality of our uncomplicated cases of labyrinth operation is 0.

During the last years when we have regularly examined the functions of the patient before operation and at operation have carefully searched for defects in the labyrinth capsule, we have not encountered any fatalities among patients who did not present fatal complications before operation.

Realizing the small percentages of these cases, I think the following conclusions are justified:

1. Operation on the labyrinth brings very little additional danger to the patient.

2. The prognosis of labyrinth suppuration is improved by operative opening of the labyrinth.

The case-reports follow (see original).

DEAFNESS OF THE NEWBORN: A DISTURBANCE OF THE SOUND-CONDUCTING APPARATUS OF THE EAR.

By Dr. W. KOELLREUTTER,

FIRST ASSISTANT IN THE ROSTOCK UNIVERSITY EAR CLINIC.

(Translated from the *Zeitschr. f. Ohrenhlk.*, Vol. LIII., No. 3, 1907.)

EIGHTY years ago Rudolphi recognized that the newborn did not react, or only to a slight degree, to sounds and noises. Subsequently all investigators have come to about the same results, but it has never been determined whether this deafness was due to a peculiar condition of the sound-conveying apparatus of the newborn or to the rudimentarily developed perceptive power of the sound-perceiving apparatus of the ear.

I have endeavored to approach this question by functional examination with the continuous tone series of Bezold–Edelmann in the newborn up to the age of 14 days.

First I should like to quote a few of the views which obtain in aural physiology in regard to this question.

I begin with a brief report of the development of our knowledge concerning the peculiar conditions found in the tympanum in the newborn.

In 1797 Herholdt found that the tympanum of the fœtus contained mucus and amniotic fluid, the Eustachian tube serving as entrance. One year later Scheel found that the amniotic fluid was still present after birth.

He regarded this as a provision on the part of nature to dampen sound and thus prevent injury to the ear. Von Troeltsch, towards the end of the fifties in the last century, reported on the results of his histologic examinations of the tympanum in the newborn. He also found that the tympanum contains not only amniotic fluid and mucus, but also a mucous layer completely occluding the lumen of the middle-ear cavities. This mucoid layer could disappear before birth, and the hyperplastic mucous membrane may contract before birth, whereupon the amniotic fluid would take its place. This was later on confirmed by Moldenhauer, and proved to be the starting point of all those who have since investigated the cause of deafness in the newborn.

Preysing two years ago showed that this mucoid layer sometimes existed after birth and especially in the mastoid antrum or in the niches and holes of the tympanum, especially about the oval and round windows. This contradicted the view that the mucoid tissue always disappeared within the uterus, and that directly after birth, as soon as the amniotic fluid was replaced by air, normal conditions were present. Preysing was able to show in one case that seven months after birth myxomatous tissue was found in the submucosa of the tympanum. He concludes that the degree to which this mucoid tissue disappears at the time of birth is individually different, and that the retrogression under certain conditions may take place very slowly.

This has aided those who believe in the theory that the deafness of the newborn is entirely due to a middle-ear lesion. It seems difficult to understand why certain authors should regard the horizontal position of the drum membrane as responsible for the deafness, as the auditory canal permits the reflection of the sound waves in any position. The narrowness of the canal or the apposition of the walls cannot be regarded as regular obstructions to sound conduction.

The deafness of the newborn has also been examined functionally.

Kussmaul endeavored to obtain some information as to the hearing of the newborn, which he published in 1859, in his celebrated "Investigations on the Soul of Newborn Man." He says that "of all the senses that of hearing is the most asleep. It is possible to produce the loudest noise near the ears of the newborn during the first days without producing any reaction. I have attempted numerous experiments without any result. Dr. Feldbausch, Assistant in the Obstetrical Clinic, assures me, however, that unquestionably some of the sleeping children were seen to start in bed when somebody clapped his hands under the bed. This was observed in a child of three days. We, therefore, cannot say that the newborn does not have any auditory perceptions."

Though we cannot agree with these absolutely negative results of Kussmaul, the positive observations of Feldbausch do not seem to be conclusive, as concussion of the floor and of the bed by the clapping of the hands is not excluded.

Ranke in his *Principles of Human Physiology* says: "The loudest noise does not seem to make any particular impression on the newborn child. After a short time it begins to perceive the high tones. This seems to be due to a moderate sensitiveness of the auditory nerve. In the older child the highest and loudest tones are the most agreeable. Loud noises which are unpleasant to adults seem to be agreeable to the child." This theory of the lessened sensibility of the auditory nerves must in our present views be regarded as questionable, as perception of the highest tones usually indicates good conduction of the auditory nerves.

Genzmer in 1873 published his "Investigations on the Perception of the Senses in the Newborn," in which he says: "In order to determine the relative distinctness of hearing, I observed the greatest distance at which children

perceived the beating of a small bell by closing their eyelids." The bell was heard usually at a distance of 8–10 inches. He found that all children after the first or the second day were receptive for auditory impressions, and that an improvement in hearing occurred during the first weeks of life. He believes that the auditory sense is individually different in the various persons, but Preysing's investigations have shown that the difference in the hearing of the newborn may be so much more easily explained by the irregular extent and distribution of the myxomatous tissue in the tympanum, especially about the windows. Moreover in Genzmer's investigations the ages of the children are not given except in two cases, and it is also not stated whether they were examined in a waking or sleeping condition.

Moldenhauer has also investigated the functional condition of the newborn ear. He examined the hearing by air conduction by means of a toy. This showed that the children reacted on the first attempt. At the same time the amount of the reaction differed in the various individuals and even in the same person on different days and under different conditions. He found that after a longer period of experiment the child became more or less accustomed to the noise and further experiments were valueless. Children born at full term and premature children showed no difference in the amount of reaction. He was not able to find an increase of the sound perception, as Genzmer states—without, however, coming to any definite result. These observations also lose somewhat in value inasmuch as this toy alone was used as the source of sound, as, on account of its unpleasant harshness and loudness, it is questionable whether any distinct auditory impression was produced, or whether or not pain was experienced by the sensory fibres of the auditory nerve which Politzer believes to exist. This question is also suggested by Moldenhauer in his report.

In Preyer's recent work on *The Soul of the Child*,

the interesting examinations of this author are given. He has not made any systematic investigations, but has carefully studied his own child from day to day in order to obtain some information about its hearing. According to this author, every newborn child is to be regarded as deaf, because he was not able to convince himself until the first half of the fourth day that his child was no longer deaf. It is very difficult to determine exactly when the first sensation of sound is felt, because we have no sign of a perceived sound impression. He also believes that there are individual differences, partly hereditary and partly acquired, to explain variations in the hearing of the newborn, and that after prolonged experimentation the hearing can be improved, though transient diminution occasionally occurs. His experiment with the tuning-fork placed on the vertex of the skull is also of interest though incorrect.

The gynecologist, Lange, in his book on *The Physiology, Pathology, and Care of the Newborn*, writes that hearing in the newborn is difficult to examine. Contraction of the eyelids, the general drawing together, and the crying of children, as we notice after very loud noises, may be the reflexes to all forms of irritants. Moreover faint noises may be heard without causing any visible reaction. He believes that all children are receptive for auditory impressions after the first or the second day, and that only very severe auditory impressions cause any reaction during the early days in childhood.

Sachs (*Arch. f. Ohrenheilk.*, vol. xxxv.—"Observations on the Physiological Condition of the Hearing in the Newborn") has examined the hearing of children shortly after birth. He has evolved the following theory: that newborn children only react to noises, not at all to tones, even if these are directly transmitted to the ear by a tube. As he accepted the theory which now to-day is contradicted, namely, that the perception of tones and noises takes place at different nerve terminal stations,

he decides that the cochlea in the newborn is not sufficiently sensitive to perceive tones; the semicircular canals have, however, progressed further in their development, so that they perceive noises. I have experimented by placing vibrating tuning-forks in various places on the skull, but never succeeded in producing the slightest reaction. I have examined children during sleep, during a waking condition, and while they were nursing. These children always perceived noises but never tones. The examination of older children showed that in general there was a slight reaction to tones, especially c^2. The deep tones were never perceived. There seems to be a predilection for the high tones. In all children there was a distinct and strong reaction to noise. In an isolated case there was a weak reaction to tones and a distinctly better hearing or exclusive perception of the high tones. Some children gave only a reaction to noises and none to tones either by air or by bone conduction.

Gomperz, in his book on this subject, believes that the reaction of the newborn to noises is not so slight as is generally accepted. According to him the hearing power of nurslings develops very markedly from the second week of life. He found that ordinary sound impressions, as have been employed by Kussmaul and Feldbausch, caused contraction of the eyelids and quick convulsions of the facial muscles in nurslings of one day.

Our material consisted of 20 newborn children. They were all examined in a sleeping or a half-sleeping condition. The source of tone was the Bezold–Edelmann tone series, and the examinations were only made by air conduction. To compare our results with those of Moldenhauer, we also used the musical toy, the cricri. Of the tone series we made use of the following forks—subcontra C, c^2 and c^3, and Galton's whistle c^6. The tuning-forks were set in vibration so that no impression could be conveyed to the child either optically or by a

draught. The Galton whistle was approached to the ear without causing any current of air. The results were observed by three persons who were witnesses to the examinations. The room for examination was a quiet room. The children were repeatedly examined for several days and at different times of the day.

We find that:

1. The cricri produces in all the children a distinct reaction at all times, even a few hours after birth.

2. The tones c^6 of the Galton whistle produced a distinct reaction in:

(*a*) all children within the first 24 hours after birth.

(*b*) 74% of all the children between 2 and 4 days old.

3. The tuning-forks subcontra C, c^2 and c^3 never produced any reaction.

We therefore find a good reaction to high tones from birth, while deep and middle tones in the first days apparently were not perceived at all.

It is remarkable that the newborn infant who perceived a few hours after birth the tone of the Galton whistle, when the experiment was repeated on the following days remained absolutely quiet and without interest.

We have been able to show that all newborn children react to high tone c^6 on the first day of life, while the deep tones are not perceived. It seems, therefore, that there is no reason to doubt the power of irritation which the auditory nerve possesses in the early age of children. This irritability in the light of present knowledge is shown by this reaction to the high tone c^6, while the insignificant reaction to the other deep tones points to a disturbance of the sound-perceiving apparatus for which there is a well-known anatomic foundation.

REPORT OF THE SIXTEENTH MEETING OF THE GERMAN OTOLOGICAL SOCIETY AT BREMEN, MAY 17 AND 18, 1907.

By Dr. J. HEGNER, Heidelberg.

Translated by Dr. Percy Fridenberg, New York.

1. Dr. A. Hartmann (Berlin): **Report of the committee on the examination of the ears of school children.** There should be a preliminary examination and otiatric tests for diminished hearing. The latter is to determine the degree of deafness, cause and nature of the affection, and the possibility of cure. About half the cases can be improved or cured by timely treatment. The hearing should be tested by arbitrary words whispered without accentuation while the other ear is closed by an assistant. The cases should be divided into high degrees, hearing the whisper at ½ metre or less with the better ear, medium grades, ½–3 metres, and slight degrees, 3–8 metres.

In the *Discussion:* Wanner (Munich) referred to the importance of repeating the hearing tests and otiatric examination after infectious disease. Siebenmann (Basel) advises plugging the free ear with damp absorbent cotton in case assistance is lacking. The Society resolved to send copies of the report to the higher school boards of the German federal states.

2. Kuemmel (Heidelberg): **Bacteriology of acute middle-ear inflammation.** Previous investigations, while numerous and extensive, were carried out under such varying conditions of material and method that no definite decision could be formed as to the relative frequency of the various pathogenic

organisms. In the Heidelberg hygienic institute, Suepfle had examined 200 cases of otitis. Besides 14 cases of sterile "transudate" and 13 of sterile secretion in the early stage of otitis accompanying acute infectious diseases, organisms were found in 144. About 66% of these cases were due to streptococcus pyogenes, 11% to the streptococcus mucosus, 6% to pyogenes aureus and albus. The findings in pyocyaneus otitis were not decisive. A similar percentage may not hold good in other regions or at other times. The frequent mention of streptococcus lanceolatus as the specific cause of otitis may be due to the difficulty of distinguishing it with certainty from other forms of streptococci, especially as the str. mucosus was unknown to earlier investigators. Most cases of lanceolatus otitis occur in the first two decades, particularly in children up to ten; str. pyogenes being well represented in childhood also. Operation is never required in otitis due to pyogenes aureus and albus, and but rarely, and then generally in early childhood, in lanceolatus cases. In streptococcus otitis the probability of an operation being necessary is 1:3; with streptococcus mucosus, an even chance. Staphylococcus otitis tends to run a protracted course, and its complicating presence with other organisms may affect the progress of the case, although it is more probable that these germs are present as saprophytes only, and that the chronicity of the apparently mixed infection is to be attributed to factors as yet unknown.

The development of chronicity is certainly not a necessary result of the presence of staphylococci. A cyclical course of lanceolatus otitis, described by some writers, could be noted only in those cases in which the germ in question had also become localized in other parts of the organism. Streptococcus mucosus seems, as others have remarked, to have a special tendency to destruction of bone, which may not become manifest until later on, often after the otitis has run its course. This peculiarity was formerly attributed, erroneously, to the str. lanceolatus. Individual peculiarities of the patient, local as well as general, of which we now know little or nothing, have something to do with the course of otitis. One of these individualities is the nature of the connection between the epitympanum and the meso-tympanum.

A free communication offers better chances for healing of the otitis without surgical intervention. The difference in the course of the epitympanic and meso-tympanic variety of otitis is seen most clearly in cases due to str. pyogenes, as almost all the operative cases of this nature are of the epitympanic type. There is no definite pathological explanation for this peculiarity. Hæmatogenous infection has a greater tendency than the tubal infection to cause severe constitutional disturbances and to implicate the mastoid cells. Secondary otitis would appear to be caused at times without the direct agency of micro-organisms by toxines, healing rapidly unless infected by germs, in which case it runs the usual course.

3. DENKER (Erlangen): **Bacteriological examinations in acute middle-ear suppuration**. In 20 cases of acute mastoid empyema, the mastoid pus revealed at operation was carefully examined. Streptococcus pyogenes was found in 62%; streptococcus mucosus, in 13.8%; staphylococcus pyogenes, in 17%; indeterminate Gram-resistant diplococci, in 7%. Diploccoccus pneumoniæ was not found at all, although 9 cases occurred in children. The staphylococcus pyogenes was found twice as frequently as in the Heidelberg series, the results otherwise corresponding to those of Kuemmel. The latter found pneumococci, too, in over 18.5% of all cases examined, but in only 2 cases was this germ found in the mastoid pus. These two cases both died of meningitis, and streptococci were found in the lumbar puncture fluid and in pus from gland abscesses. This shows that the diplococcus of pneumonia is rarely the specific pathogenic microbe in acute empyema of the mastoid.

4. KOBRAK (Breslau): **Agents and paths of infection in acute otitis media**. The development in the middle ear of invading micro-organisms may be expressed clinically in a more or less marked general reaction, and bacteriologically in the condition of the blood. The latter presents positive data only in those cases in which well marked constitutional symptoms accompany the process in the middle ear. The specific germs are found in the blood in only a small fraction of the cases, characterized by a more or less markedly pyæmic course.

The germs are most apt to be found in the circulation in otitis due to streptococcus longus, rarely in mucosus, pneumococcus, or staphylococcus aureus otitis. Definite agglutination of germs cultivated from the aural secretion by the serum of the patient is seen in pneumococcus otitis, rarely in other forms, and seems to have some relation to the severity of the infection and to the cyclical course of the disease. Other serum reactions could not be shown. There was no definite correspondence between the virulence of the specific germ in animals and the severity of the infection in the patient. The cyclical course is generally due to pneumococcus; a more protracted and frequently pyæmic form, to the streptococcus longus; and an "interval" form, to the strept. mucosus. In this last form there is a free interval between the first attack of otitis and the later development of complications, as the infection tends to run its course either at once or in successive steps in the primary focus, while there is a latent process in the neighboring structures. Streptococcic bacteroæmia after acute otitis can be cured in about half the cases. In otogenic sepsis a decrease in the number of colonies in the blood and lessened hæmolysis do not by any means speak absolutely in favor of a recovery, but the opposite conditions are always ominous. The finding of streptococcus mucosus suggests careful watching of the patient for some time after the apparent cessation of the first attack of otitis.

5. NEUMANN (Vienna): **Bacteriology of acute middle-ear suppuration.** Infections with the typical diplococcus run the most rapid and mildest course. The nature of the infecting organism is not important for the development of complications in acute otitis, but the pneumatic structure of the mastoid process is a factor of moment. The course of the complications is, however, influenced, as capsulated cocci have a greater tendency than the non-capsulated variety to cause a spread of the process to neighboring territories.

6. WITTMAACK (Greifswald): **Bacteriology of acute middle-ear inflammation.** Typical diplococcus cases run the mildest and most rapid course. Mastoiditis is much more frequent in infections due to the streptococcus mucosus, which tends to cause extradural abscess, and similar complications, even

when the middle-ear inflammation is mild. The finding of this germ is of clinical importance. Its capsule may be stained red with thionin, rendering culture tests unnecessary, and allowing a differentiation from lanceolatus and pyogenes.

Discussion of 2–6: SCHEIBE (Munich) is surprised that Kuemmel found no influenza bacilli. In former times the streptococcus pyogenes was infrequently found on opening the mastoid; now it seems to be found constantly.

SIEBENMANN (Basel) calls attention to the lack of a uniform criterion of bacteriologic data. There is little uniformity of methods, and in his experience the statistics vary greatly in different years, and even with different observers.

LEUTERT (Giessen): A positive finding of bacteria in the blood from the jugular, while absent from the blood from a vein in the arm, means disease of the sinus or bulb.

WINCKLER (Bremen): The streptococcus causes the severest types of infection. At certain times and in certain epidemics, *e. g.*, scarlatina, it is particularly frequent. In such infections with a marked tendency to general sepsis, streptococcic serum should be used energetically.

HOFFMANN (Dresden): has examined 30 cases of acute operative empyema of the mastoid. Streptococci were found in 10; staphylococci, in 9; diplococci, in 8, of which 7 showed Fraenkel's diplococcus; strepto- and staphylococci, in 1; 1 was undoubtedly, 1 probably, sterile; 23 cases were genuine, 7 secondary.

JOEL (Gerbersdorf) invariably found tubercle bacilli in the first stage of typical tuberculous otitis media. Later on, they were not to be detected.

DAHMER (Posen): thinks that time, opportunity, and locality determine the degree of special virulence. A case is reported in which lumbar puncture indicated serous meningitis, but later on the typical epidemic cerebro-spinal form became manifest.

KUEMMEL (Heidelberg): Streptococcus lanceolatus leads to complications requiring operation in only a minority of cases. Kobrak's material consisted only of very severe cases. Mucosus may at times be identified by the microscope, but generally cultures are required. Winckler's success with streptococcic serum is encouraging. Leutert's

observation may be a coincidence. It is quite possible that there may be bacilli in the circulation, and that they may be present, say in the vein of one arm, and only very sparsely in the other.

7. DENNERT (Berlin): **Acoustic physiological investigations of the organ of hearing.** Although it may be shown experimentally that sound reaches the labyrinth by three paths: the tympanic apparatus, the bone, especially the promontory, and the fenestra rotunda; the second is best adapted mechanically by nature, and plays the most important rôle. It is a question whether the molecular modus of vibration, according to Mueller, or that of "massive" vibration, of Ed. Weber, would be the more suitable. Dennert has found a definite standard of massive oscillations as affecting minute quantities of fluid, such as the contents of the labyrinth, by means of which the amplitude and intensity of oscillation may be judged. These data, with experiments on the effect of oscillations in fluid drops on resonators, and illumination of the apparatus in the ear, as well as clinical studies, show that "massive" actions of sound waves are accidental and secondary phenomena as far as audition is concerned, being eliminated by physiological structures when of the usual medium intensity, and causing injury to the apparatus when of great intensity. Molecular oscillations are the normal process.

8. SCHAEFER (Berlin): **New investigations of Helmholtz's hypothesis of resonance.** Certain secondary phenomena of tone have been cited in opposition to this theory. Schaefer shows that it explains all the secondary manifestations and hypothetical objections in regard to beats, interruptions, overtones, combination and variation tones, and so on.

9. WAGENER (Berlin): **Formation of crystals and giant cells in middle-ear suppuration.** Cholestearin crystals are often found in inspissated pus of mastoid suppuration which has healed without operation. Connective tissue with giant-cell production forms around this core, as a typical natural process of healing.

Discussion: SIEBENMANN: In chronic suppuration, particularly in cholesteatoma, small epidermic inclusions surrounded by giant cells are often seen. MANASSE observed a

similar process in a suppurating maxillary antrum cyst. BRIEGER has frequently found degenerated crystals in polyps of the ear.

10. MANASSE (Strassburg): **Demonstration of a case of congenital defect of the concha.** In this case there was complete absence of the external ear of the left side, with congenital deafness on both sides.

In the discussion KRETSCHMANN showed photographs of a case of developmental defect of the ear with facial paralysis.

11. DAHMER (Posen): **Dry treatment of acute and chronic perforative otitis media.** The author uses a tampon of gauze wound in a spiral around a beechwood peg, one end of which is covered with paraffin. The peg is withdrawn after the gauze strip is in place, and the accumulation of secretion is prevented by capillary drainage.

12. REICHEL (Bremen): **Report on 60 radical operations after Killian for accessory sinus suppuration.** The speaker laid stress on the importance of experience in the technique. Two cases died of meningitis. Of 50 cases collected, 34 had excellent, 14 passable, and 2 unsatisfactory, results as to headache and discharge. Diplopia was noted frequently at first, but as the technique improved this became rare. Paraffin injection to correct disfigurement was needed in 4 cases. A horizontal bone bridge, up to *1cm* in breadth, is made. After operation a bent glass drain is inserted, and the skin wound closed with Michel's clips. A small mouth mask is used for the narcosis.

Discussion: WINCKLER (Bremen) considers a universal or type operation unsuitable in a locality where there is such individual variation. He has devised an osteoplastic operation which does not extirpate the sinus, as the mucous membrane is not the source of danger, but rather the ethmoidal cells. The speaker demonstrated a patient whom he had operated upon for extensive necrosis of the antrum, both frontal sinuses, and upper and lower wall of the orbit.

KRETSCHMANN (Magdeburg) recommends narcosis after intubation according to Kuhn. Of late, he does not extirpate the sinus or remove the mucous membrane, but splits the exposed sac, packs it, and treats by the open method until healing has taken place.

HOFFMANN (Dresden) finds paraffin prothesis very unreliable. In large and deep frontal sinuses he advises temporary resection of the anterior wall.

Voss (Koenigsberg) finds the Killian operation satisfactory even for very large sinuses.

NOLTENIUS (Bremen) advises the formation of a broad horizontal bridge of bone. If the sinus is very small it can be curetted from below, or if large, also opened from above.

PANSE (Dresden) prefers narcosis through one nostril to intubation per os.

PASSOW (Berlin) speaks against the extra-nasal operation.

13. ROEPKE (Solingen): **Osteomyelitis of the frontal bone following sinus suppuration, and its intracranial complications.** But 13 cases of this sort have been recorded; 3 other cases were detailed. In one, a woman of twenty-three, the osteomyelitic focus was circumscribed by chiselling off the affected portion of the frontal bone. The patient died of frontal lobe abscess, which unfortunately was not opened by operation until the terminal stage, and probable rupture into the lateral ventricles. The abscess had developed before the operation on the bone, which had been infected by retention of pus in the sinus. In the second case, that of a student of twenty-three, with syphilis, infection of the abnormally thick diploë of the anterior sinus wall took place 5 weeks after removal of the anterior wall of the sinus. The affected frontal bone of the left side was chiselled away broadly to the margin of the hairy scalp. Death followed rupture of a *right* frontal-lobe abscess into the meninges and the lateral ventricles. The abscess was opened by operation on the evidence of left facial paralysis and of the extremities of the same side. The abscess had a dense capsule and could not be connected with the osteomyelitis focus which had been circumscribed by the operation. In the third case, the outcome was favorable, the osteomyelitis remaining limited to the anterior sinus wall of both sides which contained a thick diploëtic layer.

14. ESCHWEILER (Bonn): **Demonstration of specimens of mucous membrane in acute and chronic accessory sinus inflammation.**

15. BRIEGER (Breslau): **Pathology of otogenous pyæmia.** Parietal thrombi explain the cases in which large, obstructing

thrombi cannot be found in the sinus or bulb, but they cannot account for the development and continuance of general infection. Clinical data are valuable only when the thrombus is directly demonstrated, after Whiting-Meier, in the pinched off sinus. The thrombus must not only permit the entrance of bacteria into the general circulation, but actually keep up the general pyæmic infection. Even in cases of advanced and florid metastatic pyæmia, thrombi are found in such an advanced stage of organization that they can hardly supply the infectious material needed for a progressive general sepsis. There must be some direct importation of micro-organisms into the blood current. As in osteophlebitic pyæmia, we must bear in mind the possibility of bacteria multiplying and circulating in the blood, rather than a constant fresh supply from the original focus. In pyæmia complicating acute suppuration, there may be no thrombosis, or at least none sufficiently important of itself, as regards the pyæmia and metastases, to suggest an attack on the sinus without special indications.

16. NEUMANN (Vienna): **Instrument for opening the jugular bulb.** The speaker uses a Nelaton catheter armed with a Gigli wire saw. After opening the jugular vein the instrument is carried through into the sinus which has been exposed, or from above downward, and the outer bridge of bone of the jugular foramen sawed through from within outward.

17. RUDLOFF (Magdeburg): **Demonstration of an operation chair.**

18. HOFFMANN (Dresden) demonstrated **specimens of a brain abscess in course of healing**, and a stereoscopic view of an abscess with thickened capsule.

19. HEGENER (Heidelberg): **Demonstrations for the study of brain abscess.** (*a*) Solitary abscess of right motor cortical region, communicated from a sinus phlebitis by Trollard's vein (large anastomotic vein between the superior longitudinal and lateral sinuses.—P. H. F.). (*b*) Unoperated cerebellar abscess with sinus-phlebitis and labyrinthitis. Abscess and phlebitis probably developing by intermediation of the sacculus endolymphaticus. (*c*) Cerebellar abscess following labyrinthitis, probably due to toxic meningo-encephalitis. (*d*) Photographs of progressive suppuration of the cerebral

hemisphere, lasting 2½ months in spite of wide opening of abscess, and finally causing death, not by meningitis, but by respiratory paralysis.

Discussion of 18–19: MANASSE (Strassburg) showed drawings of Hegener's case of transitory aphasia and agraphia, showing the thrombosed vein, and detailed a case of diagnosed right cerebellar abscess developing 8 months after evacuation of a left intradural abscess.

20. OPPIKOFER (Basel): **Rhinoscopic examination during menstruation, pregnancy, and delivery.** The speaker found, as did Freund and Zacharias, hyperæmia and slight hypertrophy of the mucous membrane of the nose in gravid women, but such changes are found in many other subjects and have no causal connection with pregnancy. No intumescence could be detected just before a labor pain, as claimed by Freund, nor was there any similar condition during menstruation. There was no marked tendency to hemorrhage and no increased sensibility in any case. A normal nasal mucosa does not become altered during any of the states mentioned in the title.

21. BARANY (Vienna): **Theory of nystagmus**: Only slow motions of the eyes are innervated from the vestibule, rapid oscillations originating in the supra-nuclear centre for fixation. Light narcosis inhibits rapid oscillations together with voluntary movements, while the slow form of nystagmus is not affected. In case of paralysis in the fixation centre, vestibular irritation causes slow motions, only, of the eyes, while nystagmus does not occur. This form could be called supra-nuclear ophthalmoplegia in contradistinction to the nuclear ophthalmoplegias, and to Wernicke's pseudo-ophthalmoplegia.

22. Voss (Koenigsberg): **Radiography in otology,** recommends steresocopic radiograms, made with Wheatstone's mirror stereoscope, and demonstrated a large number of photographs from anatomical specimens and from the living subject.

23. WASSERMANN (Munich): **Significance of the X-ray in diagnosis of affections of the antrum, and ethmoidal and frontal sinuses.** Radiographs make a differential diagnosis possible between affections of the ethmoidal and frontal sinuses. The rhinoscopic examination alone is very unsatisfactory. Positive findings are invariably confirmed by

the discovery of pus or of thickened mucous membranes on operation. The radiograms may also be used after operation and compared with later views, as a criterion of results.

24. WINCKLER (Bremen): **Radiographs of the mastoid process.** These pictures, taken from the front or the side, allow prognostically important conclusions to be drawn as to the thickness of the tegmen tympani, the pneumatic, spongy, or compact structure of the mastoid, and even show sequestra. Abscesses, particularly those of the temporal lobe, should be skiagraphed before operation.

25. HARTMANN (Berlin) demonstrated an **instrument case** and a **phantom for rhinological and bronchoscopic practice.**

26. SIEBENMANN (Basel): **On osteomyelitis deafness.** (Published in the German Edition, *Zeitschrift f. Ohrenh.*)

27. SIEBENMANN (Basel): **Demonstration of labyrinths of deaf-mutes.** Specimens and drawings of vestibule and cochlea of a deaf-mute with retinitis pigmentosa. This form is characterized by implication of the static apparatus, as correctly surmised by Bezold from the result of functional tests.

28. WITTMAACK (Greifswald): **Injuries of the ear due to effect of noises.** (Published in *Zeitsch. f. Ohrenh.*)

29. ESCHWEILER (Bonn): **Demonstration of histo-pathology of the deaf-mute ear.**

30. PANSE (Dresden): **Interpretation of histological specimens in disease of the inner ear.** The following changes are undoubtedly morbid: In the bone: loss of the malleolus, resorption by osteoclasts, or apposition by osteoblasts, formation of bridges or filling up of pre-formed cavities with bone, connective tissue, blood, pus, exudate with fibrin, or bacteria. In the membranous labyrinth: colloid is a pathological product, but apparent changes in the form of membranes and cells must be interpreted guardedly. Displacement of the attachment of Reissner's membrane shows dilatation of the cochlear duct, but in changes of the papilla (p. spiralis; organ of Corti) putrefactive changes and artefacts can be excluded only if the nucleus and the cell boundaries are preserved. A diminution of cross-section of the nerves in the bony canals is proof of atrophy, but in the trunk of the

auditory nerve this may be caused by traction in removing the brain post mortem. The ganglion spirale often presents a diminution in the number of cells at the base as a sign of senile atrophy. Nerve staining is often indistinct on account of decomposition and acids.

31. Voss (Koenigsberg): **Pathogenesis of nystagmus in unilateral injury of the labyrinth.** A case is reported in which one labyrinth was not capable of stimulation. After injury to the other labyrinth, which had reacted normally, nystagmus toward the uninjured side developed.

32. BARANY (Vienna): **Clinical significance of relations of vestibular apparatus to cranial traumatism.** 40 cases were carefully examined, the character of the vertigo being determined in each instance, spontaneous, rhythmic nystagmus in extreme rotation being looked for. Only marked degrees in otherwise normal eyes are significant, as mild degrees are seen in health. Attacks of nystagmus with vertigo on stooping, or rapid motions of the head, are of practical importance. Identification of the spontaneous nystagmus by the production of an experimental nystagmus of similar character by means of the turn table is a valuable diagnostic aid. Antagonistic rotation of the eyes is frequent. The term of Ménière's disease or complex is no longer sufficient, as there are various forms.

33. NEUMANN (Vienna): **Circumscribed labyrinthine suppuration.** Of this, as well as of the diffuse form, there are latent and manifest types. Presence or absence of spontaneous nystagmus, on looking toward the diseased or toward the sound side, sensibility of the vestibular apparatus, and the auditory function, and finally the local condition of the labyrinth wall found on opening the middle ear, will determine whether the simple radical with preservation of the inner ear is to be modified by opening of the labyrinth.

The following will be published in the *Transactions* of the German Otological Society:

34. STIMMEL (Leipzig): **Treatment of chronic otitis media by suction hyperæmia** (Bier). Simple compression of the cervical veins and suction hyperæmia were of little value in acute and subacute otitis, but the latter method, if persisted in, gives excellent results in chronic cases of not too long

standing, and, of course, without dangerous complications. Cessation of discharge and fœtor and, in some cases, improvement of hearing were noted. The suctions lasted at most fifteen minutes, were applied every second or third day, and repeated from five times, in favorable cases, to thirty-five times in the obstinate ones.

35. REINHARD (Cologne): **Case of gonococcus otitis.** Case of a child fourteen days old, with blennorrhœa of the eyes, and right otitis media. Gonococci were found in the pus from the ear. Dry treatment used without effect. Rapid recovery after irrigation with solutions of permanganate of potash, cleansing, and instillation of 1% protargol.

REPORT OF THE TRANSACTIONS OF THE SECTION ON OTOLOGY, NEW YORK ACADEMY OF MEDICINE.

MEETING OF OCTOBER 11, 1907. DR. WENDELL C. PHILLIPS, CHAIRMAN.

Presentation of Cases.

CASE I.—**Case of facial paralysis.** TALBOT R. CHAMBERS, M. D.

Pearl L., aged seventeen, nervous temperament. Father died when she was ten years old. During the past two years she has had three severe falls on her head. One time she was picked up by her drunken brother and thrown into a box, sustaining injuries which lasted a long time. For three months afterward she could not turn her head without pain. Her mother was compelled to rub the left scapular region every night before she could go to sleep.

On September 28th she was exposed to rain, although she says she did not get wet. The next day facial paralysis set in, which was complete at first, but improved a little on the third day. There was an acid taste in the left side of the tongue, and she could not eat on the left side of the mouth. The left hand was cold. She says she has not perspired on the left side of her body for eight years, and has always been a mouth-breather.

Examination of ears shows both to be normal. Hearing for watch, whisper, and voice normal. Left bone conduction ten seconds longer than right. Hears highest Galton whistle and lowest tuning-fork. Fork placed upon top of head is heard equally in each ear. Faradism fails to elicit slightest

response from extrinsic muscles left eye and is very weak for buccal muscles. Left retinal veins enlarged without neuritis. Right retina normal. Vision $\frac{20}{20}$ in each eye. No contraction of visual field for white, red, or green, and there is no spasm of accommodation and fauces sensitive, thus throwing out hysteria. Nose has a large synechia between inferior turbinate and septum on the right side, and there is a large posterior spur of the septum on the left side pressing into the outer wall.

Dr. Chambers said that he hoped some of the members might be able to give him some suggestions in regard to the case. She seemed to be a case for the neurologist.

Discussion: Dr. JOHNSON said that it would not be wise to consider the question of operation until after the question of treatment had been carefully considered. He himself had seen at least two cases of facial paralysis coming on in this way from exposure to cold. The fact of her having received injuries at various times would indicate the possibility of the injury being at the bottom of the trouble. However, the patient is decidedly neurotic, and as the trouble has existed for only ten days it would seem that the best thing to do would be to send her to a neurologist and let him struggle with the high-frequency current or some form of galvanism.

CASE II.—**Abnormal condition of ear, presenting the appearance of a radical operation.** J. J. THOMSON, M.D.

This patient was recently seen by Dr. Thomson, giving a history of chronic suppuration as long as she can remember, after measles in childhood. Last May she had several polypi removed, since when the discharge has been less. Two weeks ago it ceased and she began to have a moderate degree of pain, which has also stopped. She gives no history of operation except the removal of polypi, but the ear presents the appearance of a complete radical operation. A probe can be passed far back into the mastoid, and the ear presents the typical appearance of a radical mastoid operation. She has never taken any anæsthetic, and declares she has never had any operation except the removal of polypi.

Discussion: Dr. PHILLIPS said that such cases were occasionally encountered. Some years ago he presented to the New York Otological Society a similar case which he described

as Nature's Radical Operation. In that instance, however, the posterior wall was not so much broken down as in this one. He had never before seen so complete an operation performed by nature.

In response to Dr. Thomson's request for suggestions as to what should be done in case the pain continues, Dr. Phillips said that this was usually an indication of intracranial complications, and he had seen some very serious results in cases where a discharge had continued for years and then suddenly ceased, followed by pain.

CASE III.—**Neurotic girl with history of repeated operations upon the ears, but showing little indication of serious operative interference.** W. H. HASKIN, M.D.

Discussion: Dr. JOHNSON said that it was sometimes surprising, in reopening a mastoid upon which a complete operation had been performed, to find an unexpected amount of bone tissue present.

Papers.

Report of a case of mastoiditis, followed by an interdural abscess which perforated at the parieto-occipital suture, producing an enormous abscess of scalp. By JOHN MCCOY, M.D.

This patient, Mr. A. B., age twenty-five years, single, Italian by birth, came into the clinic of Dr. John L. Adams at the N. Y. Eye and Ear Infirmary on Feb. 5, 1907. He gave the following history:

About three weeks previously he had pain in his left ear followed by a slight discharge of pus; this discharge continued, he thought, for about a week. He then noticed that there was pain on motion of the auricle, and tenderness and swelling back of the ear. This pain and swelling subsided on application of ice back of the ear. About one week prior to coming to the clinic he noticed a swelling taking place on the back of his head, and this swelling gradually increased in size. He said that he ate and slept fairly well during all of this period. The principal symptoms complained of on entrance to the hospital were deafness in the left ear and the swelling over the occiput.

Examination of the left ear showed no discharge in the

external canal; the posterior wall was œdematous around a small furuncle; the fundus contained moist secretion possibly from the middle ear. The membrana tympani cannot be completely inspected on account of the swollen condition of the canal; such as can be seen is covered with desquamating epithelium. The hearing is considerably diminished, the watch can be heard only on contact. There is no pain on pressure over the mastoid. Over the occiput there is a very large, soft, fluctuating swelling extending from the vertex almost to the neck. On admission to the hospital his temperature was 100.5° F. Pulse 106. He denied all history of syphilis.

At *operation*, Feb. 5, 1907, a crucial incision was made into the fluctuating mass over the occiput and a very large quantity of pus was evacuated. On probing the wound the probe was found to enter between two bony structures on the left side about three inches back of the ear. When the skull was exposed at this point it was found to be necrosed, and granulations were budding through from the dura at the parieto-occipital suture. The bone was removed around this area and an abscess cavity was found which extended forward to the mastoid region. The mastoid was then opened and the antrum was found filled with granulations, the internal plate was deficient over the sinus with granulations at this point, and the superior layer of cells was found necrotic. A direct communication existed between these necrotic cells and the abscess. The bone was then removed back to the parieto-occipital suture. The external layer of the abscess-sac was now removed, which seemed to be a portion of the dura. The wound was dressed and the patient made an uneventful recovery.

The pathogenic micro-organism found was the pneumococcus.

The case is interesting and unique from the fact that the patient exhibited so few symptoms with such an extensive involvement, and in the course which the interdural abscess took in escaping at the parieto-occipital suture.

Discussion: Dr. WALTON BROWNE (Belfast, Ireland) told of a case which had been referred to him, after having been treated for influenza, rheumatism, and septicæmia. He

found an abscess over the occipital bone, and upon opening this under the antrum and pressing it behind the pus could be observed. He simply cut down and cleaned out the abscess cavity.

Dr. ARNOLD KNAPP inquired concerning the exact location of the pus in Dr. McCoy's case, whether it was not extradural.

Dr. McCOY replied that it was not a case of extradural abscess. He did not know, however, whether to call it subdural or interdural—it seemed to be a splitting up of the membrane. The inner wall of the abscess was so thick that it seemed as though it might be a part of the dura itself.

Report of two cases of brain abscess. J. J. THOMSON, M.D. (Published in full on pp. 576-585 of this issue.)

Discussion: Dr. PHILLIPS said that he saw the second case several times, and was present when Dr. Thomson opened the small abscess in the middle cerebral fossa. It was a most interesting case because of the fact that the man remained for so many weeks with an inflammation involving the intracranial tissues and mastoid without producing any symptoms. He was also familiar with the other case during its entire course, and it was surprising that a case of cerebellar abscess should give so few symptoms. All who saw it were surprised when the autopsy revealed a large cerebellar abscess.

Dr. DAVIS said that he had operated upon the first case himself four years ago. At that time all the mastoid cells and outer plate were removed on both sides. Dr. J. J. Thomson did a radical operation on the right ear, about three months later, because of continued discharge from that ear (Dr. Davis being confined to bed with typhoid fever at the time). The patient made a good recovery, and continued under Dr. Davis's observation for three years, being seen at intervals.

A short time after the radical operation on the right ear the patient injured the membrane lining the middle ear by falling on a stubble. The ear discharged for a number of weeks, but finally healed up entirely. During these three years, once in a while the patient would have some trouble in the left ear, but would go for months without any discharge. He had been a delicate boy all his life, but after the operations he improved, gained in flesh, and was more robust. He was

seventeen years old at the time of his death, and Dr. Davis was greatly surprised to hear of his death from the abscess.

Dr. DUEL inquired whether the lateral sinus on the left side was carefully examined at the time of the autopsy. It would be interesting to know if there was an obstructive sinus following the operation, which had subsequently infected the cerebellum.

Dr. CHAMBERS, referring to the remarkable absence of symptoms, said that he had had a patient, a man aged fifty-five, a locomotive engineer, who for a month had queer actions, ascribed to the change from a small locomotive to a large one. He would go in the street and play with the children as a grown man would not do, and acted irrationally but not enough so to take him from his work. He was suddenly taken sick and had a running ear. The doctor was sent for and his symptoms were found to be alarming. Within four hours after being called he did a radical operation, and was satisfied that everything was nice and clean. The patient, however, did not come out from the effects of the ether, but died in six hours. Autopsy revealed a quarter of an inch of purulent lymph extending all around the cerebrum—on both sides and in front,—without having given any symptoms at all.

Dr. PHILLIPS asked Dr. Hubby, who had made the examination for blood pressure, whether he had found anything peculiar or interesting in his investigations.

Dr. HUBBY replied that the most interesting point was the change of pressure. The blood pressure went up and down with the change of symptoms.

Dr. THOMSON said that one of the questions which he had hoped would be discussed was the advisabiiity of trephining the skull. There was great difficulty in discovering any pus, notwithstanding the fact that when he felt sure the patient was about to die he had made punctures in all directions, backwards, forwards, and all around. He wondered whether it would have been better to have entered the skull and investigated the brain thoroughly through an opening directly over the external surface of the temporo-sphenoidal lobe.

Dr. PHILLIPS said that he did not think Dr. Thomson would have had any better success with the case if he had made an

independent trephine opening higher up in the skull. There was little doubt but that his knife had entered the abscess, but the pus was too thick to be evacuated in that way. He thought that the proper place to open an abscess was from the under surface, and not high up with the trephine opening.

Dr. DUEL said that many failures had been reported in cases of brain abscess, resulting in death a few days after the operation from meningitis. He thought that all who have to deal with such cases should read Ballance's last article on this subject and follow his technique. It is important that the abscess should be followed through the route of infection, especially if it comes from the ear. He believed that if the Ballance technique were more generally followed the reports in regard to brain abscess would be much improved.

Otalgia, considered as an affection of the sensory portion of the seventh nerve. J. RAMSAY HUNT, M.D. (Published in full in this issue.)

Discussion: Dr. BRYANT said that the members of the Section were much indebted to Dr. Hunt for the work he has done on the facial nerve, both for what he had shown to-night, and what he had done previously. He did not, however, agree entirely with Dr. Hunt in the matter of these unusual cases of otalgia which Dr. Hunt found reported in literature, and which he explains by the disturbed function of the sensory tract of the facial nerve. Dr. Bryant said that his own observation in a total of upward of 37,000 patients had been that otalgia without congestion was due to the fifth nerve. He had never seen a case that could not be explained by a lesion of the respiratory tract somewhere above the trachea. This had been proved by the removal of the cause, but he was sure that true neuralgia of the ear might exist, and it was well for us to have our attention called to it by Dr. Hunt.

Dr. HUNT replied that it is true most of the otalgias are of reflex origin, the focus of irritation being situated within the distribution of the second and third divisions of the fifth nerve. A small number of well observed cases have been recorded by competent otologists in which no irritation focus was demonstrable, and yet the affection was undoubtedly neuralgic in character. These must therefore be regarded as primary or idiopathic in origin, and according to his views referable to the sensory system of the facial nerve.

REPORT ON THE PROGRESS IN OTOLOGY DURING THE FOURTH QUARTER OF THE YEAR 1906.

By Prof. ARTHUR HARTMANN, Berlin.

Translated by Dr. Arnold Knapp.

NOSE AND NASO-PHARYNX.

a.—GENERAL PATHOLOGY AND TREATMENT.

448. Oppikofer. **Contributions on the normal and pathological anatomy of the nose and antrum.** *Arch. f. Laryngol.*, vol. xix., No. 1.

449. Goerke, Max. **Observations on the pathological anatomy of the nose and accessory cavities.** *Arch. f. Laryngol.*, vol. xix., No. 2.

450. Kubo. **On the development of the so-called lobular hypertrophy of the nasal turbinals.** *Arch. f. Laryngol.*, vol., xix., No. 2.

451. Hobbs, A. G. **Priapism from nasal reflex: something for rhinologists.** *Indiana Med. Jour.*, October, 1906.

452. Rucker, J. B. **A study of the nature of the micro-organisms found in the mouths and throats of healthy persons.** *Univ. of Penna. Med. Jour.*, October, 1906.

453. Heath, A. C. **A simple contrivance for the relief of hay fever.** *Jour. American Med. Assn.*, October 20, 1906.

454. Park, W. H. and Throne, B. **Results of the use of refined diphtheria antitoxin: Gibson's globulin preparation in the treatment of diphtheria.** *Am. Jour. Med. Sciences*, November, 1906.

455. Goodale, J. L. **Examination of the throat in chronic systemic affections.** *Boston Med. and Surg. Jour.*, November 29, 1906.

456. Bardes, Albert. **Syphilis of the nasal fossæ.** *Med. Record*, November 10, 1906.

457. Buckley, C. F. **A method of operating on the lip.** *Medical Record*, November 3, 1906.

458. Welty, C. F. **Acute and chronic suppuration of the ear and nose the direct cause of facial erysipelas.** *Jour. Am. Med. Assn.*, December 22, 1906.

459. Perkins, R .G. **Relation of the bacillus mucosus capsulatus**

group to rhinoscleroma and of the various members of the group to one another. *Jour. Infectious Diseases*, January, 1907.

460. MOSCHER, H. P. **A speculum for submucous resection of the septum.** *Laryngoscope*, January, 1907.

461. PENNINGTON, M. E. **Virulence of diphtheria organisms in throats of well school children and diphtheria convalescents.** *Jour. Infectious Diseases*, January, 1907.

462. KOLLE, F. S. **A new operation for the correction of malformations about the nasal lobule.** *N. Y. Med. Jour.*, January 12, 1907.

463. GRADLE, H. **A method of graduated removal of the inferior nasal turbinal.** *Chicago Med. Record*, February, 1907.

464. BROWN, ROBT. G. **The relation of the tonsil to infection and infectious diseases.** *Med. Record*, March 2, 1907.

465. BLACKWOOD, Jr., J. D. **Vincent's angina; with report of cases.** *Am. Med.*, March, 1907.

466. KUYK, D. A. **An operative method for the reduction of the inferior turbinate other than by cauterization or excision.** *Jour. Amer. Med. Assn.*, March 2, 1907.

467. BALLIN, M. J. **A case of rhinoscleroma treated with the X-ray.** *N. Y. Med. Jour.*, March 16, 1907.

468. CARTER, W. W. **Primary carcinoma of inferior turbinate.** *Med. Record*, March 16, 1907.

469. THRASHER, A. B. **Primary syphilis of lips and tonsils.** *Lancet-Clinic*, March 23, 1907.

470. FANONI, ANTONIO. **Observations on nasal and intra-nasal syphilis.** *Post-graduate*, March, 1907.

471. VANCE, A. M. **Technic of cleft palate operation and removal of silk sutures.** *Surg. Gynecology and Obstetrics*, March, 1907.

472. RUPPERT, F. G. **A new tonsillotome.** *Laryngoscope*, March, 1907.

473. SIEBENMANN. **Lupus pernio of the upper respiratory passages.** *Arch. f. Laryngol.*, vol. xix., No. 2.

474. FEIN. **On primary tuberculosis of the nasal mucous membrane.** *Berlin. klin. Wochenschr.*, 1906, No. 48.

475. COHN. **Old and new on nasal tuberculosis.** *Arch. f. Laryngol.*, vol. xix., No. 3.

476. ESCAT. **Epistaxis and purpura hemorrhagica.** *Annales des mal. de l'or*, etc., February, 1907.

477. HAUSELMANN. **On nasal tamponade.** *Monatschr. f. Ohrenhlk.*, 1906, p. 658.

478. JÜRGENS. **On the treatment of the nose in scarlet fever.** *Russ. Monatsschr. f. Ohrenhlk.*, December, 1906.

448. OPPIKOFER. *Contributions on the normal and pathological anatomy of the nose and antrum.*

The nose and accessory cavities of 200 bodies were examined

and the mucous membrane of the lower and middle turbinals subjected to microscopic examination. Two more important conclusions are the following: In 3% of the cases the sphenoidal cavities communicated; accessory sinus affections are more frequent in men than in women. In youth, notwithstanding the moderate development of the accessory cavities, inflammations are relatively frequent. There are cases of ozæna without any disease of the accessory cavities. Squamous and transitional epithelium are occasionally found in the lower and middle turbinals in noses not the seat of ozæna. The so-called intra-epithelial glands occur almost regularly in the normal nasal mucosa. VON EICKEN.

449. GOERKE. *Observations on the pathological anatomy of the nose and accessory cavities.*

The paper of Oppikofer just reviewed has led the author to say that: (1) He had previously drawn attention to the fact that in autopsies on decrepid individuals exudates are frequently found in the neighboring cavities of the nose which do not give any clinical symptoms; (2) he had been the first to draw attention to the presence of intra-epithelial glands in the nasal mucosa; (3) opposed to Oppikofer's view, intra-epithelial collections of leucocytes occur very frequently in the mucosa of the upper respiratory passages; (4) he had previously emphasized the manifold degenerative processes which take place on the epithelium of the nasal mucosa.

VON EICKEN.

450. KUBO. *On the development of the so-called lobular hypertrophy of the nasal turbinals.*

The papilli consist of capillaries, connective-tissue fibres, mucous cells, and round cells; they correspond to the adenoid layer of the turbinals in the adult. The glands empty regularly in the deepest parts of the tissues between the papilli; their ducts are sometimes cystically dilated; the lacunæ are reduced compared with normal turbinals; the connective-tissue fibres are increased. The hypertrophy of the elastic fibres occurs in proximity to the granular ducts. Histologically the lobular hypertrophy of the lower turbinals resembles most the polypoid formation of the middle turbinals.

VON EICKEN.

451. HOBBS, A. G. *Priapism from nasal reflex: something for rhinologists.*

Male, aged thirty-three, had heavy pain across the brow which increased during the day. The day following, in addition to these symptoms he had priapism which increased in severity for two days. Local application of adnephrin and cocaine to the swelling in the nose caused the symptoms to subside. Subsequently applications of the galvano-cautery to the hypertrophies in the lower turbinate have prevented a recurrence of the symptoms for more than a year.

CLEMENS.

452. RUCKER, J. B. *A study of the nature of the micro-organisms found in the mouths and throats of healthy persons.*

In all the throats examined by the author streptococci and diplococci were found, showing them to be the normal inhabitants of the normal mouth and throat. The streptococcus mucosus was found in 70% of all the cases. A typical pneumococcus occurred in 50%; typical pneumococcus was present in 25% of the cases examined. Organisms of the same species may behave differently in their action on starch if the organisms are from different sources. CLEMENS.

453. HEATH, A. C. *A simple contrivance for the relief of hay fever.*

The appliance consists of two rings, made of cork, hard rubber, or German silver, connected by a transverse band. Over the rings is stretched fine grass linen or chiffon. The rings are placed one in and across each nostril about one half inch from the external opening so that all air inspired must pass through this fabric. In cases where the appliance has been used relief was felt in from fifteen minutes to one hour.

CLEMENS.

454. PARK, W. H. and THRONE, B. *Results of the use of refined diphtheria antitoxin: Gibson's globulin preparation in the treatment of diphtheria.*

The results obtained in a series of one hundred cases show that the removal of a considerable portion of the non-antitoxic globulins, as well as the albumins from the serum by the Gibson method, has eliminated much deleterious matter from

the serum, so that local complications and constitutional disturbances are less likely to occur from its use. The globulin preparation has been used in several thousand cases of diphtheria without accident. CLEMENS.

455. GOODALE, J. L. *Examination of the throat in chronic systemic infections.*

Nine cases of cervical adenitis are reported which demonstrate that tuberculous cervical adenitis may exist in association with the presence of tubercle bacilli in the tonsils and is not necessarily affected by their removal; also that a form of cervical adenitis occurs, accompanied by distinct enlargement and subacute or chronic inflammation of the tonsils, which disappears after a tonsillotomy. CLEMENS.

456. BARDES, ALBERT. *Syphilis of the nasal fossæ.*

No attempt should be made to correct a deformity due to syphilis until the patient has been subjected to a course of medication covering a period of two years, otherwise the surgical procedure may excite irritation and ulceration. A nasal deformity can be greatly improved by subcutaneous injections of paraffin. Small injections at different sittings are advised. Artificial bridges and supports have been tried without success. A dental plate of hard rubber for a perforated palate gives the best satisfaction. CLEMENS.

457. BUCKLEY, C. F. *A method of operating on the lip.*

The method employed by the author for the removal from the lip of benign growths, or those that are malignant without glandular involvement, is described as follows: A pair of Murphy intestinal anastomosis clamps, with their blades sheathed in rubber tubing to protect the engaged skin and mucous membrane from the effects of their serrated surfaces, are applied as indicated in the diagram, with their edges about three-eighths of an inch from the line of proposed incision. The local anæsthetic is injected and the portion of the lip containing the growth is then excised. Sutures are inserted at the points shown and the edges of the wound are then approximated, the clamps removed, and the dressing applied.

CLEMENS.

458. Welty, Cullen F. *Acute and chronic suppuration of the ear and nose the direct cause of facial erysipelas.*

The author assumes that there is sufficient evidence to state that erysipelas of the face is due to direct infection from a contaminated field of pure or mixed infections of streptococci; that the injection can be demonstrated in the majority of cases; that epidemics of erysipelas are nothing more than a direct wound infection through surgeons or nurses, and that the idiopathic erysipelas is a misnomer. He believes that the streptococci attain a more virulent form when one of the various cavities is infected. Clemens.

459. Perkins, R. G. *Relation of the bacillus mucosus capsulatus group to rhinoscleroma and of the various members of the group to one another.*

Among the conclusions reached in these experiments are, that the so-called rhinoscleroma bacillus has no etiological relation to the disease of rhinoscleroma but is rather a secondary invader. The organisms found in the nose and nasal growths in rhinoscleroma are different in different cases, although of the same general group. Clemens.

460. Moscher, Harris P. *A speculum for submucous resection of the septum.*

The solid blades of Killian's speculum are modified by the substitution of blades made of wire. These fenestrated blades are adjustable so that any length may be used and they are sufficiently strong for the necessary work. At all times the condition can be seen through the wire blades without the necessity of withdrawing the speculum. The solid mouth of the speculum has a dull finish which removes the reflected light so tiresome to the eye. Clemens.

461. Pennington, M. E. *Virulence of diphtheria organisms in throats of well school children and diphtheria convalescents.*

It has been found that among well school children, approximately 10% have bacilli in their throats which correspond morphologically with the organisms of diphtheria. One half of these organisms were without effect on guinea-pigs. About 30% acted like attenuated forms and 14%

killed the animals with a fair degree of promptness. The organisms found in the throats of well persons who have not been exposed, are in the majority of cases without virulence; but these are sometimes responsible for a true diphtheritic infection. Organisms in the throats of well, exposed persons possess a marked degree of virulence and are responsible for more infections than the organisms from well, unexposed persons. The organisms from the throats of patients convalescing from diphtheria are very virulent, and may be disseminated as long as they remain in the throats, which period may far exceed the duration of the clinical evidences of the disease. CLEMENS.

462. KOLLE, F. STRANGE. *A new operation for the correction of malformations about the nasal lobule.*

This operation applies particularly to the correction or reduction of an over-prominent nasal tip due to excessive growth or congenital malformation of that part of the nose, giving the organ an undue prominence and a hook-like appearance usually associated with a narrow, sharply upward inclined upper lip. The operation may also be used for the correction of hyperplasia nasi and rhinophyma. There is no disfigurement; complete recovery follows in five days.

CLEMENS.

463. GRADLE, H. *A method of graduated removal of the inferior nasal turbinal.*

Operating on the hypertrophied turbinal for enlarging the breathing space is performed where the condition is not favorable for a submucous resection or removal of a spine. It is also used in those cases where the turbinal does not obliterate or obstruct the breathing permanently, but through periodic turgescence the passage is temporarily occluded. It has never been found necessary to remove the entire turbinal, but it is well to resect a thin slice of bone to insure a permanent reduction of the cavernous tissue.

The device is a motor-driven trephine working within a guard. The essential part of the machine is the guard, a brass tube 8.5*cm* long with an internal diameter of 7*mm*. Twenty-five *mm* beyond the front end of the tube, one-half

of its circumference is cut off, leaving thus a semi-cylindrical shell. CLEMENS.

464. BROWN, ROBERT C. *The relation of the tonsil to infection and infections diseases.*

The author demonstrates how well the tonsil is arranged, from an anatomical standpoint, to resist infection. Inflammation of the tonsil is caused by a pathogenic germ trying to enter, and the inflammation itself is essentially a defensive reaction. When the resistance of the body is lowered from any cause, or the germs are virulent enough to overcome the other means of defence which the tonsil has in common with the rest of the oral mucous membranes, or if the tonsil is wounded, a positive chemotaxis having been produced, there is a lacunar tonsillitis. When a negative chemotaxis is produced, there is a general systemic infection without a tonsillitis. The relation of the tonsil to infection and infectious diseases is one of protection. CLEMENS.

465. BLACKWOOD, Jr., J. D. *Vincent's angina; with report of cases.*

Nine cases are here reported, occurring in children from two to ten years of age. Of this number, seven were of the superficial or mild diphtheroid type of Bruce, and two were from healthy children, smears from whose throats showed the presence of the bacillus fusiformis and in one instance associated with spirillum. The seat of the attack was on the lips, tongue, gums, cheek, tonsil, or pharynx, and in none was there marked destruction of tissue. No glandular enlargement occurred except that which existed prior to the disease. Attacks lasted from four to twenty-two days. CLEMENS.

466. KUYK, D. A. *An operative method for the reduction of the inferior turbinate other than by cauterization or excision.*

The author reviews the many objections to the methods of cauterization and excision of the turbinates, and he offers the following suggestion as a satisfactory substitute: The operation consists in one or more incisions through the mucous membrane of the hypertrophic turbinate well down to the bone, when with a broad nasal saw the bone is cut to a depth

depending on its nature, whether cancellous or vitreous, which is easily detected by the sensation imparted to the hand. If the bone is dense and hypertrophied the cut is carried well down into its substance. The nostril is cleaned and the edge of the incised mucosa carefully tucked down into the cut which has been made with a wide saw to allow this. The tissues are kept in place by a carefully adjusted pledget of cotton saturated with equal parts of compound tincture of benzoin and flexible collodion. The dressing may be left *in situ* for several days, when, after careful soaking, it is removed without disturbing the tucked-in edges. Repacking is rarely necessary. The advantages claimed by this method are: Preservation of physiologically active tissues, freedom from disagreeable reaction or complications, absence of shock, freedom from aggravation of existent disease in related cavities, and ease and speed in its performance.

CLEMENS.

467. BALLIN, MILTON J. *A case of rhinoscleroma treated with the X-ray.*

The patient, female, aged fifty-three, first noticed nose and throat trouble sixteen years ago. She came under the writer's observation about one year ago, and on examination he found the larynx free from disease. The pharynx was one mass of cicatrices, destruction of the uvula, and the nose enlarged to double its normal proportions. The nasal passages were entirely occluded. The entire nose felt stony hard and appeared fixed. The X-ray treatment was employed three times a week, exposure lasting from three to four minutes, over a period of five months. No unpleasant effects followed except a slight dermatitis, which disappeared on suspending the treatment for a short time. At the end of the fifth month, the nose was reduced to almost its normal size, the redness disappeared, the tissues became softer and more pliable, and the outline of the nostrils again returned. The ulcerations dried up. It is stated that it is far better in these cases to give short exposures with high-frequency currents than long exposures with lŏw-frequency. CLEMENS.

468. CARTER, W. W. *Primary carcinoma of inferior turbinate.*

The case reported occurred in a woman thirty-eight years of age. The diagnosis was confirmed microscopically. The tumor was a typical columnar-celled epithelioma of five months' duration. The growth and all the surrounding tissues in the superior maxilla were removed, and at present, three months after the operation, there is no recurrence.

CLEMENS.

469. THRASHER, A. B. *Primary syphilis of lips and tonsils.*

These cases are reported to show that such affections are more common than is usually supposed. In two of the cases, the tonsil was the seat of the lesion, which produced no pain whatever, and in the other two the ulceration was situated on the lips. CLEMENS.

470. FANONI, ANTONIO. *Observations on nasal and intranasal syphilis.*

The first case of the series reported was chancrous erosion of the tip of the nose; the second, the ulceration was confined to the right side of the nasal septum; the third had a thickened, dull red, semilunar patch on the left ala nasi, and the fourth a thickened incrustation of the inner aspect of the right ala nasi and all of the septum. CLEMENS.

471. VANCE, A. M. *Technic of cleft-palate operation and removal of silk sutures.*

In order to avoid the stitch holes in these operations, silkworm gut and a pair of ordinary aspirator needles of small size are used. Through one of the needles the gut is threaded double and in the other a single strand is placed. The needle with the double suture is passed first, the loop being pushed through it after the needle, and opposite this is placed the needle with the single thread. The single suture is engaged in the loop, and on withdrawing both needles the loop pulls the single suture through, leaving it in the proper position to be tied. CLEMENS.

472. RUPPERT, F. C. *A new tonsillotome.*

The instrument consists of an under and upper blade with a

fork. The blades are curved so as to form about a right angle near the cutting part which is parallel to the handle.

CLEMENS.

473. SIEBENMANN. *Lupus pernio of the upper respiratory passages.*

This infrequent disease belongs to the tuberculous rather than to the pseudoleukæmic processes. The case observed showed from the beginning an involvement of the mucous membrane of the mouth, pharynx, larynx, and nose. The specimen removed for examination showed tubercle-like tissue with pronounced development of connective tissue but without caseation. Animal experimentation was negative. No reaction to tuberculin. An intercurrent erysipelas caused the entire process to disappear, but it returned after a certain interval. The paper is illustrated by pictures of the face showing the œdematous condition of the lids and the cheek. The changes in the mucous membrane are also described and two histological pictures given. VON EICKEN.

474. FEIN. *On primary tuberculosis of the nasal mucous membrane.*

The patient was a woman twenty-five years of age without any other tuberculous disease. The anterior extremity of the right lower turbinal was the seat of tuberculous changes resembling lupus of the mucous membrane. The infection in this case is supposed to have occurred by way of the air current. MÜLLER.

475. COHN. *Old and new on nasal tuberculosis.*

The author concludes as follows:

1. Tuberculous affections of the nasal cavity may be divided into: (*a*) Lupus: with or without lupus of the external nose with granulations particularly in the anterior parts, usually on the septum, though the turbinals and the nasal floor may be involved in otherwise healthy and young individuals. There is frequently an eczema of the vestibule and an anterior dry rhinitis. (*b*) Tuberculosis, generally in the form of ulceration with infiltration, tumors and granulation tissue; always secondary in markedly tuberculous individuals with possible tuberculosis of the lung.

2. External nasal lupus usually starts from the anterior angle of the introitus. Lupus situated thus can frequently only be detected by rhinoscopy.

3. Primary lupus of the nasal mucosa can remain isolated for months or years without any other tuberculous disease appearing. VON EICKEN.

476. ESCAT. *Epistaxis and purpura hemorrhagica.*

The author has observed, in the course of two years, four patients suffering from epistaxis, where on closer general examination evidences of purpura hemorrhagica were present. The author urges in cases of habitual epistaxis, especially in children, that the skin and mucous membrane should be examined for hemorrhages. BOENNINGHAUS.

477. HÄUSELMANN. *On nasal tamponade.*

To avoid nasal tamponade the author recommends using perhydrol (Merck). This may be applied by the patient himself. If the hemorrhage cannot be arrested by this means a small pellet of ferric-chloride gauze can be applied. WITTMAACK.

478. JÜRGENS. *On the treatment of the nose in scarlet fever.*

To remove pus from the naso-pharynx, the nose is to be irrigated with a small rubber bulb, using a solution of boric acid or salt solution, 2 to 3% solution peroxide, or, in severe cases of gangrenous angina, lime water or bichloride 1 to 5000. The solutions are to be warm. SACHER.

b.—OZÆNA.

479. LERMOYEZ. **The contagiousness of ozæna.** *Berlin. klin. Wochenschr.*, 1906, No. 47.

480. BOTEY. **The injection of solid paraffin in ozæna.** *Arch. internat. d'otol.*, etc., No. 3, 1906.

479. LERMOYEZ. *The contagiousness of ozæna.*

The author is a believer in the bacillary theory of ozæna. The paper contains clinical observations, reports on pathological examinations, and bacteriological discussions. Practically the author recommends that patients suffering from

ozæna should use protective measures as regards their surroundings and especially with reference to children.

MÜLLER.

480. BOTEY. *The injection of solid paraffin in ozæna.*

After describing a new form of syringe, the author states that he has treated 360 cases of ozæna with submucous injection of paraffin during the last four years. According to his statistics, 45% are curable; of the remaining, 20% can be improved to such an extent that the scabs and fœtor disappear and the patient can dispense with the nasal douche. On an average, 20 injections are necessary for each patient; in one patient, however, with advanced ozæna, 100 injections were practised. After paraffin injections under the septal mucous membrane, in about 3% of the cases abscess appeared, but only then when at one sitting more than 0.5 solid paraffin was injected. The abscesses contained serous rather than purulent fluid.

OPPIKOFER.

c.—TUMORS OF THE NOSE.

481. JOHNSTON, R. H. **Sarcoma of the nasal fossa.** *Med. Record,* December 8, 1906.

482. RICHTER. **A new method of removing naso-pharyngeal fibroma.** *Monatsschr. f. Ohrenhlk.*, 1907, No. 2.

483. DELAMARE. **Contribution to the study of sarcoma of the nasal fossa.** *Thèse de Paris*, 1905.

484. ALTHOFF. **On endothelioma of the internal nose and of the neighboring cavities.** *Arch. f. Laryngol.*, vol. xix., No. 2.

485. PRAWOSSRED, N. **Carcinoma of the frontal sinus.** *Wratschebnaja Gaseta*, 1906, No. 13.

486. GERBER. **Osteomata of the frontal sinus.** *Arch. internat. d'otol.*, etc., vol. xxxiii., No. 1.

487. STEPINSKI. **Polypi of the choanæ in children.** *Arch. internat. d'otol.*, etc., vol. xxxiii., No. 1.

481. JOHNSTON, RICHARD H. *Sarcoma of the nasal fossa.*

Patient, female, aged sixty-five, had nasal obstruction and neuralgic pains on the same side of the face. There was a decided, hard, non-painful prominence of the nose externally which had been present for years. On looking into the nose a grayish-white mass, hard to the touch, could be seen above. Below, on a level with the inferior turbinate, was a pink growth, which bled easily. The nose was opened by an

incision in the naso-labial fold, the nasal bone was removed with cutting forceps. A hard, rounded mass revealed itself as a bony cyst of the middle turbinate which had no connection with the tumor proper. The fossa was filled with large masses of the growth, which was attached to the middle and inferior turbinates, the floor of the nose, and the walls of the antrum. The origin seemed to be from the antrum. The operation was only partially successful—a large mass was found extending into the naso-pharynx, all of which could not be removed. The examination of sections of the growth showed a very malignant, mixed-cell sarcoma. The patient died two months after from exhaustion. CLEMENS.

482. RICHTER. *A new method of removing naso-pharyngeal fibroma.*

The snare was first applied and tightly drawn around the base in order to constrict the blood-vessels; a second snare was then applied directly below the first, and after removing the guide it was used after the manner of a wire saw, so that the tumor was removed after ten minutes without the loss of any blood.

483. DELAMARE. *Contribution to the study of sarcoma of the nasal fossa.*

Twenty-seven cases of sarcoma of the nasal cavities have been collected by the author. The tumor occurs at every age of life. The course and prognosis depend upon the microscopic condition. The more connective tissue present in the growth, the more favorable the prognosis in general. Operative treatment can cure the condition. OPPIKOFER.

484. ALTHOFF. *On endothelioma of the internal nose and of the neighboring cavities.*

The structure of epithelioma is fully described and the points of differential diagnosis between this tumor and carcinoma and sarcoma given. Three cases are reported.

OPPIKOFER.

485. PRAWOSSRED. *Carcinoma of the frontal sinus.*

The patient presented a fistula below the left eyebrow and the eye protruded. A probe could be passed to the optic

foramen and into the frontal sinus. A frontal empyema was first diagnosed and Czerny's operation was attempted, but severe hemorrhage occurred and masses of carcinoma appeared. The anterior walls of both frontal sinuses and the upper wall of the left orbit were destroyed. The microscopic examination of the tumor showed carcinomatous pearls. Up to the present time only 3 cases of carcinoma have been described occurring in the frontal sinus. Of diagnostic importance is the fact that in empyema the probe comes in contact with carious bone, while in carcinoma it can be introduced to a great depth without any resistance.

SACHER.

486. GERBER. *Osteomata of the frontal sinus.*

Eighty-four osteomata of the frontal sinus were collected, also two personal observations with case histories are given. In general the author reaches the same conclusions as Hucklenbroich (Dissertation, Freiburg, 1905). OPPIKOFER.

487. STEPINSKI. *Polypi of the choanæ in children.*

Stepinski reports 5 cases of polypi of the choanæ in children; 4 cases were microscopically examined, showing the tumor to be myxofibroma. OPPIKOFER.

d.—DISEASES OF THE ACCESSORY SINUSES.

488. WELLS, W. A. **The choice of operation in the treatment of maxillary sinus suppuration.** *Laryngoscope*, December, 1906.

489. DARLING, S. T. **The nasal accessory sinuses and pneumococcus infections.** *Jour. Am. Med. Assn.*, November 10, 1906.

490. STUCKY, J. A. **Mental symptoms due to disease of nasal accessory sinuses.** *Med. Record*, November 24, 1906.

491. CRYER, M. R. **Some variations in the frontal sinuses.** *Jour. Amer. Med. Assn.*, January 26, 1907.

492. MERMOD. **On chronic suppuration of the maxillary antrum.** *Annales des mal. de l'or.*, etc., January, 1907.

493. HALLE. **External and internal operations in suppuration of the accessory sinuses.** *Berl. klin. Wochenschr.*, Nos. 42 and 43, 1906.

494. CORDES. **On the preservation of the lower turbinal in the radical operation for chronic maxillary empyema, with formation of a nasal counter-opening.** *Monats. f. Ohrenhlk.*, 1906, No. 11.

495. TEXIER. **Caseating maxillary sinusitis: symptoms and diagnosis.** *La presse oto-laryngologique Belge*, No. 2, 1907.

496. VAN DEN WILDENBERG. **Osteomyelitis of the superior maxil-**

lary and of the ethmoid bone, with empyema of the sinuses and of the orbit. *Arch. internat. d'otol.*, etc., No. 2, 1906, and *La presse oto-laryngologique Belge*, 1906, No. 10.

497. ONODI. **On the disturbances of vision and blindness caused by disease of the posterior ethmoid cells and of the sphenoid cavity.** *Berl. klin. Wochenschr.*, 1906, No. 47.

498. SPRENGER. **A case of cyst of the mucous membrane of the frontal sinus.** *Arch. f. Laryngol.*, vol. xix., No. 1.

499. DELSAUX. **Pseudo-frontal sinusitis due to a subperiosteal abscess of the forehead complicated with thrombophlebitis of the superior longitudinal sinus.** *La presse oto-laryngologique Belge*, 1906, No. 10.

488. WELLS, WALTER A. *The choice of operation in the treatment of maxillary sinus suppuration.*

The dental origin of many cases of maxillary sinus suppuration is admitted; but this must not be interpreted as justifying operation by the way of the alveolar process but only as demanding that the trouble with the teeth should be corrected. If the mere removal of a tooth makes an opening into the sinus, irrigation may be tentatively practised, not using any artificial appliance to maintain a permanent opening. But the alveolar operation should never be done as an operation of choice, because it establishes a communication between the mouth and a suppurating cavity, and requires the use of a tube or plug, which is disadvantageous. The open method of doing the canine operation is likewise to be condemned upon much the same grounds. When simple irrigation has failed, a large opening in the inferior meatus with removal of a portion of the inferior turbinate should be done. Few cases so operated on will require the employment of more radical methods. Those that do, however, should have the sinus well exposed through the anterior wall and curetted, after which the external opening should be closed, the communication made with the nose in the inferior meatus being utilized for drainage and subsequent treatment. CLEMENS.

489. DARLING, SAMUEL T. *The nasal accessory sinuses and pneumococcus infections.*

It has been found that 92% of all pneumococcus infections coming to autopsy show a very marked degree of more or less

typical pneumococcus inflammation of the accessory nasal sinuses. Ninety-one per cent. of the lobar pneumonia cases show a sinusitis. All cases of acute pneumococcus meningitis presented an inflammation of one or more of the sinuses, and in every one the middle ears and mastoid cells were normal.

CLEMENS.

490. STUCKY, J. A. *Mental symptoms due to disease of nasal accessory sinuses.*

A series of eleven (11) cases are reported showing that acute or chronic disease of the nasal accessory sinuses frequently gives rise to serious forms of mental disturbance. The ethmoidal cells were extensively involved in all these cases. The mental symptoms were marked, and included insomnia, mental depression, indifference to conditions and surroundings, morbid suspicions, and suicidal inclination. Toxins, developed by fermentation and putrefaction in the gastro-intestinal tract, combined with the sepsis from pus absorption, the influence of which acts on the cortical cells and nerve fibres of the brain, are in all likelihood the causative factors in producing the mental disturbance. CLEMENS.

491. CRYER, M. R. *Some variations in the frontal sinuses.*

The author illustrates and describes a number of variations in the frontal sinuses which include cases of multiple, unilateral, irregular, exaggerated, and absent frontal sinuses. He has found two cases in which the internal plate or wall was absent or incomplete, and in other cases the so-called ethmoid cells were pushed upward into the space of the frontal sinuses. He does not consider the variations described great exceptions, but believes if one thousand skulls were carefully examined equal variations would be found. And if the same number of diseased pneumatic sinuses were examined the variations would be found in greater proportion and more common. External evidence of these anomalies is generally wanting and examination through the nasal fossæ will give but slight information. Transillumination is usually unsatisfactory and clinical experience counts but little, as no two cases present like conditions. A good radiogram, if stereoscopic, is one of the most reliable means for disclosing

the character of the abnormality and disease in the frontal region. CLEMENS.

492. MERMOD. *On chronic suppuration of the maxillary antrum.*

The author is an enthusiastic believer in the Caldwell–Luc method. In 141 cases there were 141 recoveries with an average of 2 weeks. A very remarkable record. The local anæsthesia with cocain adrenalin has greatly simplified the operation and should make its adoption more general.
BOENNINGHAUS.

493. HALLE. *External and internal operations in suppuration of the accessory sinuses.*

The author in general is in favor of the internal treatment of chronic empyema, with the formation of an opening into the nose and of an external opening or one into the mouth as far as possible. He objects to treatment which consists of irrigations, especially when the antrum is entered by-way of the alveolus. He recommends for the antrum of Highmore the formation of an opening as large as possible in the lower nasal tract with a bore and with preservation of the lower turbinal.

The internal operation on the frontal sinus consists in removing from the nose the underlying floor of the frontal sinus and a large part of the external table of the frontal bone, so that the instrument can be palpated externally through the skin and so that the opening into the nose is as large as the thinnest part of the root of the nose is from the internal table. Fourteen cases have been treated in this manner and the results have been satisfactory. MÜLLER.

494. CORDES. *On the preservation of the lower turbinal in the radical operation for chronic maxillary empyema, with formation of a nasal counter-opening.*

The author urges the preservation of the lower turbinal in the radical operation for chronic empyema of the maxillary antrum. He has operated upon all the cases that required operation according to Denker's method except that the lower turbinal was not sacrificed, without observing any unfavorable effects on the subsequent course. The preservation of the lower turbinal is especially important in double-

sided affections. The loss of both or of the greater part of the lower turbinals produces unpleasant consequences and in addition to local changes in the throat and nose may cause permanent damage to the body. WITTMAACK.

495. TEXIER. *Caseating maxillary sinusitis: symptoms and diagnosis.*

Fifteen cases of caseating maxillary sinusitis are reported and a severe and a mild form are described. The disease is a chronic one and attacks only adults, men and women. The onset is insidious. The mild form differs but little from the other suppurations of the maxillary antrum.

In the severe form the nose is occluded and there are fetid, caseating masses with pain and the formation of fistulæ. The swelling of the turbinals does not diminish on the application of cocaine. The turbinals appear like malignant tumors or like syphilitic formations. The puncture should be used for diagnosis. The prognosis is good. Irrigation of the cavity usually leads to recovery. Other interventions should not be tried until after two or three weeks if the irrigations have not been successful. BRANDT.

496. VAN DEN WILDENBERG. *Osteomyelitis of the superior maxillary and of the ethmoid bone with empyema of the sinuses and of the orbit.*

In a new-born child on the third day there was a red spot on the left lower and inner walls of the orbit. On the tenth day the eye protruded and there was discharge from the left nose. On the same side in the hard palate and in the canine fossa there was a fistula which also discharged pus. Syphilis uncertain.

At operation the cutaneous incision followed the inner side of the orbit, then the inner and lower orbital walls were exposed to the optic foramen. The purulent ethmoid bone contained numerous small sequestra. Finally the purulent maxillary antrum was opened from the nasal cavity. As the necrosis of the ethmoid bone is palpably due to congenital syphilis, calomel was prescribed in small doses. After several sequestra were cast off recovery took place. OPPIKOFER.

497. ONODI. *On the disturbances of vision and blindness*

caused by disease of the posterior ethmoid cells and of the sphenoid cavity.

The various relationships of the ethmoid cells and sphenoid cavity to the optic canal and to the optic sulcus are described and illustrated with photographic pictures to substantiate the existence of a canalicular retrobulbar neuritis and optic atrophy of nasal origin. MÜLLER.

498. SPRENGER. *A case of cyst of the mucous membrane of the frontal sinus.*

The author thinks this to be a mucocele originating from the frontal ethmoid cells, which had bulged forward into the normal frontal sinus. VON EICKEN.

499. DELSAUX. *Pseudo-frontal sinusitis due to a subperiosteal abscess of the forehead complicated with thrombophlebitis of the superior longitudinal sinus.*

In this interesting case of thrombosis of the superior longitudinal sinus a suppurating subperiosteal abscess of the forehead was present and the nose was normal. The patient died. At autopsy there was purulent meningitis in the right frontal lobe, thrombosis of the superior longitudinal sinus, the left lateral sinus, and the jugular vein. The infection of the interior of the skull probably occurred by means of a vein perforating the frontal bone. It seems that thrombosis of the superior longitudinal sinus may take place without nasal infection. Epistaxis, which is regarded as pathognomonic for this thrombosis, may be absent. Owing to the direct connection between the superior longitudinal sinus and the left lateral sinus the infection usually follows this course. The longitudinal sinus can and must be treated surgically.

BRANDT.

e.—OTHER DISEASES OF THE NOSE.

500. MILLER, E. E. **Observations on an ideal local anæsthesia for submucous resection.** *Medical Record*, February 23, 1907.

501. COFFIN. **New operation for correction of the nasal septum.** *Boston Med. and Surg. Journ.*, January 17, 1907.

502. HURD, LEE M. **The submucous resection of the nasal septum.** *Jour. Am. Med. Assn.*, January 12, 1907.

503. SASSEDATELEW. **Habitual erysipelas of the nose and of the face.** *Russ. Monatschr. f. Ohrenhlk.*, January, 1907.

504. FORCHHAMMER. **The result of light treatment in lupus of the nose and of the mouth.** *Hospitalstidende*, No. 8, 1907.

505. WOLFF-EISNER. **Experiences with hay fever in 1906.** *Deutsche med. Wochenschr.*, No. 7, 1907.

506. BAUMGARTEN. **A tooth rhinolith in the nose.** *Wiener med. Presse*, No. 1, 1907.

507. MANASSE. **Cases of foreign bodies.** *Arch. f. Laryngol.*, vol. xix., No. 2.

508. DAAE. **Peculiar lesion of the brain secondary to the nose.** *Arch. f. Laryngol.*, vol. xix., No. 2.

509. HERBER. **Cosmetic operations on the nose.** *Deutsche med. Wochenschrift*, No. 13, 1907.

500. MILLER, E. E. *Observations on an ideal local anæsthesia for submucous resection.*

The solution suggested is made by placing from 20 to 25 grains of cocaine crystals in a shallow dish and dropping on enough adrenalin chloride solution, 1:1000, to dissolve the crystals. The anæsthesia lasts about three-quarters of an hour. CLEMENS.

501. COFFIN, R. A. *New operation for correction of the nasal septum.*

The operation is divided into two short sittings and is offered to meet the conditions unfavorable for prolonged surgical procedures. A more or less perpendicular incision is made anterior to the deviation the posterior elevator is then introduced through the incision beneath the periosteum and perichondrium and worked backward, upward, and downward until these structures are free from the septum as far as the edges of the deviation. The space so made is injected with sterilized vaselin and the nose is allowed to heal. In a week the other side is operated on in the same way, only that the incision is made more anteriorly so as not to come directly opposite the first incision. The submucous spur is removed by a blunt knife and gouge. A small pledget of cotton is now introduced to hold the perichondrium and mucous membrane in the median line Coffin believes that his operation is more likely to obtain true cartilage in the new system than in the usual window operation, because both cartilage cells and perichondrium are present between the first and second operations. CLEMENS.

502. HURD, LEE M. *The submucous resection of the nasal septum.*

In seventy-five cases the youngest patient was ten years of age; the oldest was sixty-four years. The deflections occurred one-third oftener to the left than to the right. Only six gave a traumatic history. The author does not believe that the cartilage and bone regenerate. After a period of from one to two years, on examination the septum was found flaccid to the slightest touch of the probe. A microscopical examination of a small section removed from one case revealed only the two muco-perichondria with a small amount of fibrous tissue between them. Some new instruments designed by the author are illustrated. CLEMENS.

503. SASSEDATELEW. *Habitual erysipelas of the nose and of the face.*

After the consideration of two cases the author concludes that habitual erysipelas is not always a new infection, but that it remains in the body, usually in the glandular tissues, and from there it extends through the lymphatic vessels to the parts where the erysipelas occurs. SACHER.

504. FORCHHAMMER. *The result of light treatment in lupus of the nose and of the mouth.*

The pressure glasses of Lundsgaard are employed. By means of these glasses it is possible to apply the treatment 1 to 1½*cm* farther up in the nasal cavity; in other words the parts which are the site of predilection of the lupus are made more accessible. In 47 cases 38, or 80%, gave favorable results. A number of cases of lupus of the mouth were treated with success. MÖLLER.

505. WOLFF-EISNER. *Experiences with hay fever in 1906.*

Owing to the early hot weather in 1906 the hay-fever period began two weeks earlier than usual, which meant that most of the patients had two weeks more of discomfort. The author does not agree with Dunbar, and believes that the pollen poison is not a toxin and that therefore pollantin is not an antitoxin, and that the etiological therapy can only be of value against susceptibility to pollen. The best means of preventing the entrance of pollen into the nose is the pro-

tective apparatus of Mohr modified by Schulz. The author believes that in rare cases the conjunctiva is also sensitive to pollen. These patients should wear glasses similar to the goggles of automobilists. NOLTENIUS.

506. BAUMGARTEN. *A tooth rhinolith in the nose.*

A girl sixteen years of age had suffered from epistaxis from the left side of the nose for two years. On examination there was a hard prominence in the floor of the nose which proved to be a round milk tooth. The black rhinolith was the root of the tooth. At the same time the superior maxillary cavity of this side was obliterated. WANNER.

507. MANASSE. *Cases of foreign bodies.*

Two cases of foreign bodies in the respiratory passages are described. The third case is that of a foreign body in the orbit which simulated a fracture of the lower wall of the frontal sinus. The patient, falling down-stairs, struck the right forehead against a bottle. There was a large wound at the eye, which healed in a short time. At the operation, one month later, the frontal sinus was intact, and 1 large and 8 small fragments of glass were found in the orbit.

VON EICKEN.

508. DAAE. *Peculiar lesion of the brain secondary to the nose.*

A short-sighted individual ran with great force with his nose against the point of an umbrella. The umbrella broke and the point was withdrawn from the nose. This was followed by hemorrhage and pain in the left half of the forehead. The left eye was blind. A few days later fever and signs of meningitis. Death on the twelfth day. At autopsy, in addition to meningitis there was a fracture of the fronta lbone, the ethmoid bone, and the sphenoid bone. There was a hole in the meninges and perforation of the left frontal lobe into the left ventricle. Of interest is the slow course of the disease. VON EICKEN.

509. HERBER. *Cosmetic operations on the nose.*

The operative treatment of the congenital and acquired anomalies of the nasal septum causing external deformity are

treated in this paper. Operations are usually performed subcutaneously with the aid of a knife, periosteal elevator, saw, and cutting forceps, under local anæsthesia. NOLTENIUS.

f.—NASO-PHARYNX.

510. SPRAGUE. **Observations in one thousand adenoid operations.** *Boston Med. and Surg. Jour.*, October 11, 1906.

511. JEHLE. **On the presence of the meningococcus and micrococcus catarrhalis in the naso-pharynx and attempts at disinfection with pyocyanase.** *Wiener klin. Wochenschrift*, No. 1, 1907.

512. KOBRAK. **Traumatic angina, acute exanthem, surgical scarlet fever.** *Arch. f. Laryngol.*, vol. xix., No. 2.

513. HASSLAUER. **A remarkable disease of the pharyngeal tonsil.** *Arch. f. Laryngol.*, vol. xix., No. 1.

510. SPRAGUE, F. R. *Observations in one thousand adenoid operations.*

Among these one thousand cases 503 were male and 497 were female with ages ranging from six months to thirty-seven years. In about 90% of the cases the adenoids were associated with hypertrophied tonsils to more or less degree. Investigation as to the cause of the trouble does not lead to satisfactory results. While the diseases of childhood undoubtedly help in the causation of this hyperplastic lymphoid condition the data are so incomplete and negative, and so many children have enormous growths who never had any of the exanthemata, that their importance in the etiology is not great. Sprague prefers ether anæsthesia in adenoid patients.

CLEMENS.

511. JEHLE. *On the presence of the meningococcus and micrococcus catarrhalis in the naso-pharynx and attempts at disinfection with pyocyanase.*

A relatively small quantity of undiluted or diluted pyocyanase suffices to prevent the growth of the meningococcus. The action is less marked on the cellular fluid obtained by lumbar puncture. For examination it is necessary to obtain the specimen from the naso-pharynx or from the posterior pharyngeal wall, because these infectious organisms are not to be found in the anterior parts of the nose. The amount of pyocyanase applied to the naso-pharynx varied between 0.5 and 3*cm.*

In the case of the micrococcus catarrhalis the instillation of pyocyanase in all children except one was followed by the absence of these micrococci. The meningococcus also rapidly disappears from the discharge of the naso-pharynx, usually after one or two applications.

According to the author, the meningococcus, at least in the healthy intermediate person, is only to be found in the masses of mucus and not in the mucous membrane. The action of pyocyanase was very slight or absent in the case of the streptococcus, staphylococcus, pneumococcus, and bacterium coli. WANNER.

512. KOBRAK. *Traumatic angina, acute exanthem, surgical scarlet fever.*

To answer the question why removal of the pharyngeal tonsil is occasionally followed by fever and wound infection a number of bacteriological examinations and animal experiments were attempted. These show that the number of germs and the virulence of the discharge from the naso-pharynx is generally greater before the operation than after. The field of operation is usually poor in organisms; it is in a protected position, the admission of air and the passage of secretion is unhindered. It seems, therefore, that unusually severe conditions of a foreign infection must be present. He recommends that the operation should not be undertaken when there is a more or less purulent nasal discharge unless an antiseptic treatment has been carried out for a certain length of time, and it is not wise to remove the pharyngeal tonsil during epidemics of scarlet fever or other epidemics of acute infectious disease. VON EICKEN.

513. HASSLAUER. *A remarkable disease of the pharyngeal tonsil.*

A case of herpes of the pharyngeal tonsil associated with eruption of herpes on the upper lip and the entrance of the nose. Nasal occlusion and symptoms of irritation of the eye and ear which disappeared after a few days.

VON EICKEN.

PHARYNX AND MOUTH.

514. EMERSON, F. P. **Sarcoma of the tonsil treated with Coley's toxins.** *Laryngoscope*, March, 1907.

515. ROBERTSON. **Certain facts concerning faucial tonsils.** *Jour. Am. Med. Assn.*, November 24, 1906.

516. LINK. **Acute œdema of the pharynx with report of a case requiring rapid tracheotomy.** *Medical Record*, March 2, 1907.

517. TRAUTMANN. **Multiform exudative erythema of the mucous membrane in its relation to syphilis.** *Münchn. med. Wochenschrift*, No. 43, 1906.

518. UFFENORDE. **Lateral pharyngitis.** *Arch. f. Laryngol.*, vol. xix., No. 1.

519. GOERKE. **Consideration of the pathology of the tonsil. V. Critical remarks on the physiology of the tonsil.** *Arch. f. Laryngol.*, vol. xix., No. 2.

520. MIODOWSKI. **On the presence of actinomyces-like granules in the faucial tonsils.** *Arch. f. Laryngol.*, vol. xix., No. 2.

521. CHAUVEAU. **Aberrant tonsil behind the posterior pillar.** *Arch. internat. d'otol.*, etc., vol. xxii., No. 3.

522. HENKES. **Hemostasis after tonsillotomy.** *Monatschr. f. Ohrenhlk.*, 1907, No. 2, p. 76.

523. BAUMGARTEN. **Salivary stone of unusual size and recurrence.** *Wiener med. Presse*, No. 3, 1907.

524. KRETSCHMANN. **Disturbances in the throat caused by disease of the glands of the floor of the mouth.** *Arch. f. Laryngol.*, vol. xix., No. 1.

525. PAPPENHEIM. **Isolated one-sided spasm of the tongue. A contribution to Jacksonian epilepsy.** *Wiener klin. Wochenschr.*, No. 6, 1907.

526. WEISZ. **The combination of lactic acid and sunlight treatment in a case of tubercular ulcer of the lower lip.** *Wiener klin. Wochenschr.*, No. 46, 1906.

514. EMERSON, FRANCIS P. *Sarcoma of tonsil treated with Coley's toxins.*

A spindle-celled sarcoma of the tonsil occurring in a woman sixty-four years of age was treated with the mixed toxins of bacillus prodigiosus and streptococcus erysipelatus with some success. The growth disappeared entirely and the patient regained good health, but she died seventeen months after treatment was begun from a recurrence of the tumor.

CLEMENS.

515. ROBERTSON, CHAS. M. *Certain facts concerning faucial tonsils.*

Eight (8%) per cent. of all tonsils examined were affected with primary tuberculosis, which enters through the crypts emptying into the supratonsillar fossæ, and furnished seventy-

five (75%) per cent. of tuberculosis of the tonsil, the infection taking place in the depth of the crypt. In this way the tonsils are the cause of general infection of the blood which may produce tuberculosis in any part of the body.

CLEMENS.

516. LINK, GOETHE. *Acute œdema of the pharynx, with report of a case requiring rapid tracheotomy.*

The patient had suffered with a simple attack of tonsillitis for ten days, and although the left tonsil was incised a number of times no pus was discovered. Digital examination of the throat showed bulgings of the anterior, lateral, and posterior walls. The lateral swelling increased rapidly after the examinations until the finger could be introduced but with difficulty. Intubation was impossible, so a rapid tracheotomy was performed while the case was unconscious. A vaginal hard rubber syringe tip was utilized as a tracheal tube. No sloughing nor suppuration followed the operation; the urinary analysis was negative and the case made an uninterrupted recovery. CLEMENS.

517. TRAUTMANN. *Multiform exudative erythema of the mucous membrane in its relation to syphilis.*

Seven cases of old lues with recent multiform conditions in the mucous membrane of the mouth, pharynx, and larynx which resembled syphilitic changes but were diagnosticated as multiform exudative exanthema. Treatment with salicylic acid brought recovery after a few weeks. The author believes that the infection of syphilis gives a predisposition to this erythema. SCHEIBE.

518. UFFENORDE. *Lateral pharyngitis.*

The author believes that lateral pharyngitis does not depend upon primary neuritis, but upon inflammatory processes in the upper respiratory passages. VON EICKEN.

519. GOERKE. *Consideration of the pathology of the tonsil. V. Critical remarks on the physiology of the tonsil.*

The lymphatic pharyngeal ring is a protective arrangement of the body which is shown by anatomic, physiologic, and clinical experiments. Hypertrophic tonsillar tissue must be

reduced. It is impossible to remove it radically, for there is always a regeneration of tissue as much as is necessary for the body. When the tonsils have no function to fulfil involution of the tissue takes place. VON EICKEN.

520. MIODOWSKI. *On the presence of actinomyces-like granules in the faucial tonsils.*

In 147 tonsils, structures were found in 12 which resembled actinomyces glands. They consist of a radially arranged network of hair-like fungi in which there are accumulations of cocci. VON EICKEN.

521. CHAUVEAU. *Aberrant tonsil behind the posterior pillar.*

In a patient twenty-nine years of age on the right side at the posterior pharyngeal wall there was a pedunculated hard growth as large as the egg of a pigeon. Microscopic examination showed the tumor to be an aberrant tonsil.

OPPIKOFER.

522. HENKES. *Hemostasis after tonsillotomy.*

This method consists of uniting the two palatal arches over the bleeding tonsil. The two arches are united by clamps which are inserted by peculiarly constructed instruments.

WITTMAACK.

523. BAUMGARTEN. *Salivary stone of unusual size and recurrence.*

A patient, forty-five years of age, presented on the left side of the floor of the mouth a pronounced swelling which was prolonged to the anterior part of the tongue. On incision pus was evacuated and in the depth there was a large stone weighing 1.26g consisting of phosphate of lime. Two years later the same symptoms returned with a similar stone.

WANNER.

524. KRETSCHMANN. *Disturbances in the throat caused by disease of the glands of the floor of the mouth.*

Many disturbances in the throat can be explained by pathological changes in the salivary glands in the floor of the mouth. The changes are usually of an inflammatory nature; rarely there is stasis of the secretion. The diagnosis is made

by the enlargement and tenderness of the organ, which can be easily palpated bimanually. The treatment consists of bimanual massage. WANNER.

525. PAPPENHEIM. *Isolated one-sided spasm of the tongue. A contribution to Jacksonian epilepsy.*

With the mouth open the tongue was observed to move 30 to 70 times a minute in a direction from left back to right front. The attacks lasted from 10 seconds to one minute. Synchronous with these spasmodic movements there was a softening of the right half of the base of the tongue and a diminution in size of the right half of the tongue; at the same time there were rhythmic contractions of the muscles passing from the inferior maxillary to the hyoid bone. The symptoms disappeared on the administration of bromides.

The author believes this to be a case of cortical epilepsy following the toxic action of alcohol. WANNER.

526. WEISZ. *The combination of lactic acid and sunlight treatment in a case of tubercular ulcer of the lower lip.*

The ulcer occupied the left half of the lower lip. It was treated with 20% lactic acid without result, then 25 to 50% lactic acid; following this, exposure to sunlight for about 80 hours altogether. The ulcer then healed. WANNER.

IV.—**Diseases of the Ear.** By HUNTER TOD, Aural Surgeon to the London Hospital, etc. Oxford Medical Manual. Price five shillings. 317 pages, crown 8vo. London: Hodder and Stoughton, 1907.

This is an excellent short introduction to the study of ear diseases. Each anatomical subdivision is taken up systematically with the necessary anatomical data, and instruction for the proper physical and physiological examination. The list of the diseases enumerated is sufficiently complete. The description of the functional examination is clear and the various methods are carefully described. Too much importance is perhaps given to Weber's and Gellé's tests. The surgical part is exceedingly well written. The description of the operations is clear and the indications are well defined. The intracranial complications are briefly described. The question naturally presents itself whether a much fuller description of these complications is not necessary to be of any value to the beginner in otology, or to the general practitioner; this of course the scope of the book does not permit. Perhaps the author will later see his way clear to write a text-book where brevity will not be so essential.

A. K.

V.—**The Labyrinth of Animals.** By A. A. GRAY, Aural Surgeon to the Victoria Infirmary, Glasgow. Vol. I., with 31 stereoscopic plates and stereoscope attached. Pages 198. London: J. & A. Churchill. Philadelphia: Blakiston's Sons & Co., 1907. Price, $8.40.

"This work is designed to give, by means of stereoscopic photographs, a correct impression of the membranous laby-

rinth as found in a large variety of animals. It also enables the anatomist, the physiologist, and aurist to give demonstrations of the organ in a realistic and complete way, which is impossible by the ordinary methods of anatomical dissection."

These extremely beautiful pictures of the membranous labyrinth, that most graceful and intricate structure usually hidden to most eyes by its bony capsule, are a revelation which calls forth admiration for the enormous labor and remarkable technique expended on their preparation. It is the author's intention to present in two volumes the anatomy of the labyrinth of vertebrates except fishes.

The first volume, contrary to the usual rule, begins with the human labyrinth, gradually working downward in the scale of comparative anatomy, and includes the primates, cheiroptera, carnivora, ungulata, edentata, and rodentia.

Aside from the value of this investigation to comparative anatomy and physiology, the author believes it to make a double appeal to the aurist, especially introducing a new method of preparation. This method in brief is as follows:

The bony labyrinth is fixed in formalin solution after extraction of the stapes, washed in water, subjected to increasing strengths of alcohol. From absolute alcohol it is transferred to a mixture of equal parts of alcohol and ether, thin celloidin, xylol, and paraffin. After carefully scraping off the paraffin the specimen is decalcified in a mixture of nitric and hydrochloric acids. The bony capsule is easily removed and the membranous labyrinth preserved in xylol, in which it soon becomes perfectly transparent.

The actual appearance of the labyrinth in the different animals is described, the differences in the important structures explained, exactly measured, and the whole illustrated by stereoscopic photographs.

This magnificent work will prove a most interesting and fascinating study to all.

A. K.

VI.—**Manual of Diseases of the Ear, Nose, and Throat.** By J. J. Kyle, Professor of Clinical Otology, etc., in the Medical College of Indiana, etc. Second Edition, revised and enlarged,

with 169 illustrations. Philadelphia: Blakiston's Sons & Co., 1907. Price $3.00.

This manual, of which a notice appeared in these ARCHIVES, Vol. XXXIII., p. 85, is now issued in a second edition after a relatively brief interval from its first publication. It has been revised and among the new matter added is a chapter on the diseases of the trachea and bronchi, including bronchoscopy. The many excellent features of the book previously commented upon make it one of the best of its class.

A. K.

VII.—**A Manual of Diseases of the Nose, Throat, and Ear.** By E. BALDWIN GLEASON, M.D., Clinical Professor of Otology at the Medico-Chirurgical College, Philadelphia. 12mo, of 556 pages, profusely illustrated. Philadelphia and London: W. B. Saunders Company, 1907. Flexible leather, $2.50 net.

This is a short treatise on these allied branches of medicine. The methods of examination are first given; after chapters devoted to the sterilization of instruments and the examinations of patients, the nose, pharynx, tonsils, larynx, and the ear are taken up in turn with reference to anatomy, physiology, diseases, and treatment. The text is clearly written, well illustrated, and the directions for treatment and operation are uninvolved, rational, and conservative. There is an unusual amount of information to be found in this small volume. The chapter on formulas deserves special notice. This is more exhaustive than usually found in books of this class, as it includes a detailed description of the more important drugs.

The book will be found extremely instructive and useful, and can be recommended.

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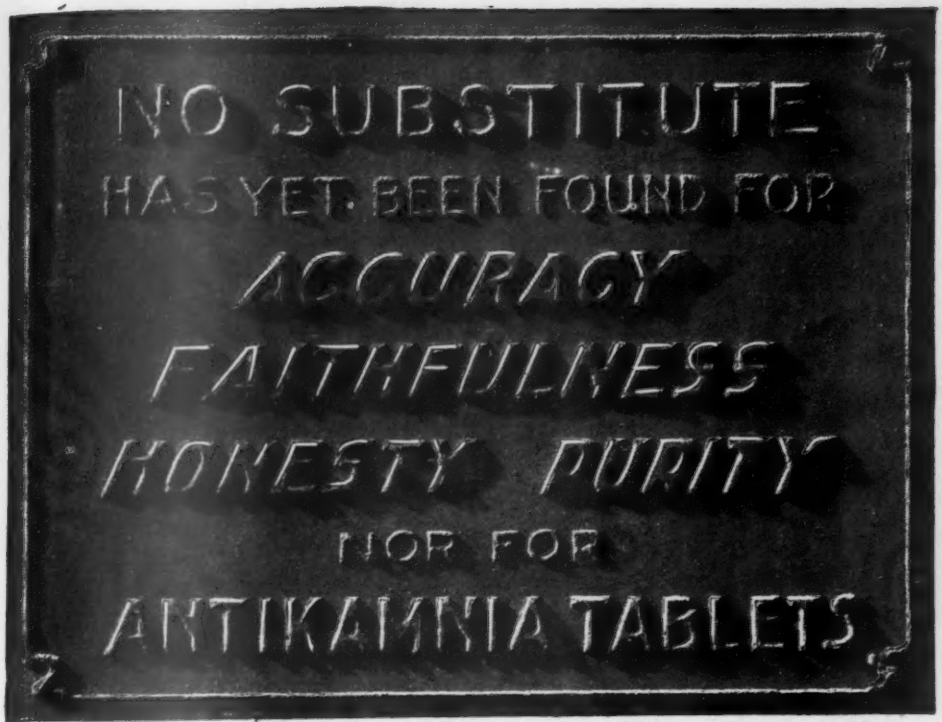

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